DESIGN AND BASES OF ENVIRONMENTAL ACCOUNTING IN OIL & GAS AND MANUFACTURING SECTORS IN NIGERIA

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MATRICULATION No. CUGP 040065

DEPARTMENT OF ACCOUNTING

COLLEGE OF BUSINESS AND SOCIAL SCIENCES

COVENANT UNIVERSITY OTA, NIGERIA.

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BY

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BEING THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING

COLLEGE OF BUSINESS AND SOCIAL SCIENCES

COVENANT UNIVERSITY OTA, NIGERIA.

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (PhD) DEGREE IN ACCOUNTING

2009

DECLARATION

I declare that this Thesis is based on the study undertaken by me in the Department of Accounting, College of Business and Social Sciences, Covenant University under the Supervision of Dr. Taiwo O. Asaolu and Dr. Enyi P. Enyi. This work has not been previously submitted for the award of a degree elsewhere. All ideas and views are products of my research. Where the views of others have been expressed, they have been duly acknowledged.

John Akhaiyea Enahoro
July 3, 2009

CERTIFICATION

This is to certify that this work was conducted by John Akhaiyea ENAHORO and was supervised by **Dr. Taiwo O. Asaolu and Dr. Enyi P. Enyi**

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CO-SUPERVISOR

DEDICATION

This work is dedicated to God the Father,

The Son and The Holy Spirit, for my life, privilege and opportunity:

'…Thou at my God, from my mother's belly' Ps. 22:10

I also dedicate this work to

my all-time supportive loving wife Esther Enahoro and

Elder Sister Eunice Ikeke Akande (Nee Enahoro) since I cannot forget my beginning

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John Akhaiyea Enahoro

PREFACE

A great challenge facing most parts of the world and particularly the developing countries is the systematic destruction of the environment. Through continued crude method of farming, felling of trees and bush burning and non-sustaining fishing methods without replacement of the natural resources, local farmers have destroyed the biodiversity. Industrial emissions have contributed in greater dimension to the atmosphere and climate change and effluent pollution to land degradation process. The practice of accounting has need to provide for accounting for impact on externalities through costing of usage of depleting natural resources, need to factor into financial statements emissions into atmosphere and discharge of pollution on land. The well being of human society should be paramount in corporate internal management decision rather than only great corporate profits if this comes at the cost of large scale degradation of the ecosystem by which we are nourished.

In the light of the background of increasing environmental attention, this study has explored an assessment of environmental accounting in the oil & gas as well as the manufacturing sectors known to have degraded the Niger Delta in Nigeria. This study is expected to facilitate effective and efficient costs measurement and reporting for corporate decision making. The study consists of the introduction in chapter one, which identifies among others the problem, objectives, significance and scope of the study as well as operational definition of terms. Chapter two dwells on literature review of environmental accounting issues, environmental theories and conceptual framework. Chapter three defines the methodology covering research design, population of study, sampling technique, description and measurement of the variables. Chapter four consists of data analyses, data presentations, design and bases of environmental cost accounting. The fifth and final chapter presents and discuses the summary of findings of study the study, recommendations, contribution to knowledge and conclusions.

John A. Enahoro

ABSTRACT

Conventional approaches of cost accounting have become inadequate because they have ignored important environmental costs and activities impacting consequences on the environment. Corporate neglect and avoidance of environmental costing have left gap of financial incompleteness and absence of fair view of financial information reporting to users of financial statements, environmental regulatory agencies and the general public. The research instruments utilized in the study were primary data survey and secondary data elucidation. For this purpose, cross-sectional and longitudinal content analyses were carried out. The test statistics applied in this study were the t-test statistics, Pearson Product-Moment correlation tests, ANOVA, and Multivariate Linear Regression Analysis. The study investigated best practice of environmental accounting among companies currently operating in Nigeria. Specifically, the study assessed the level of independence of tracking of costs impacting on the environment; level of efficiency and appropriateness of environmental costs and disclosure reporting. Findings are that environmental operating expenditures are not charged independently of other expenditures. There is also, absence of costing system for tracking of externality costs. Environmental accounting disclosure does not however, take the same pattern among listed companies in Nigeria. Considering the current limited exposure of many organizations to environmental accounting methodology, this study proffers an insight into new bases and design for environmental accounting. Recommendations among others are that corporate organizations should develop Plans and Operating Guidelines expected to meet Industry Operating Standards which should focus on minimizing impact on environment. There should be continued evaluation of new technologies to reduce environmental impacts. Standard cost accounting definitions should be agreed for environmental spending, expenditure and management accounting in the Oil & Gas and manufacturing sectors operating in Nigeria. Both the Nigerian Securities and Exchange Commission (SEC) and accounting practice in Nigeria should consider the urgency of placing demand for mandatory environment disclosure requirement on corporate organizations which impact degradation on the environment.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The need for Environmental Accounting has become the concern and focus of nations and responsible corporate managements. It became one of the foremost issues on the agenda of nations and businesses earlier in the 1990s and the reasons for this were varied emanating from both within and outside of the firm and particularly at the global level (Okoye and Ngwakwe:2004:220-235). A lot of government enactments, laws and regulations on environmental protection have been made in several nations of the world and Nigeria is slowly responding..

In the light of the awakening to environment protection, various laws and regulations such as the Environmental Impact Assessment Act, 1992 and the Department of Petroleum Resources (DPR) Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN: 2002) were enacted. These require corporate managements to consider the environmental implications of all internal decisions of their managements. Also, all organizations monitored by environmental policy agencies in Nigeria are expected to demonstrate much consideration in decision making.

Environmentalists agree that it could be more cost efficient and beneficial for companies to acquire pollution prevention or clean technology than those of pollution clean-up. It is also observed that in environmental regulations, there is a shift from the ‘command and control’ approach to market-driven forms in which pollution prevention alternatives are replacing pollution cleaning approach. It follows therefore, that determining the appropriate pollution prevention approach may lead to additional decisions to be taken by management. Such

decisions may include selecting capital expenditures, and in the opinion of Shield, Beloff and Heller (1996:5), expenditures such ‘as markets for emissions’ allowances development, may require companies to determine whether it is more cost beneficial to buy or sell these allowances, giving the cost of avoiding the covered emissions.’ This is with regard to carbon trading and sequestration.

It is rightly said that the world’s two greatest challenges are poverty and the systematic destruction of the environment. These two challenges have the capacity to destroy the entire world. It is considered that the world’s poverty level, particularly in the less developed nations is largely due to the inability to manage environment which is fast degrading. Whereas industrial emissions and effluence constitute great threat to the atmosphere, the native farmers are no less a threat to the effect of the ozone layer, the seas, oceans and land. Local farmers also systematically destroy the biodiversity through continued crude method of farming, felling of trees and bush burning and non-sustaining fishing methods without replacement of the natural resources.

Environmental issues for purpose of economic and cost accounting have also been controversial even though the topic has been identified for discussions for the past four decades. This is because common criteria for value measurement of non-marketed, non-monetized resources and impact on externalities have not been agreed.

Previously, corporate organizations have ranked business considerations based on profitability. Companies have also recognized all indirect expenditures as overheads without paying attention to the environment. Conventional accounting practice has not recognized environmental accounting for materials, water, energy and other natural resource usage. Besides, conventional accounting has not provided for such practice and particularly for

accounting for impact on externalities. According to B. Field and M. Field (2002:xv), little was recognized of the environmental depletion and degradation to the environment until a few well meaning people in the developed countries realized that it was no good having great corporate profits and material well-being if they come at the cost of large scale of the ecosystem by which we are nourished. It became clear that degradation, pollution and accelerated destruction of the ecosystem and the depletion of non-renewable environment biodiversity would soon become very dangerous to human existence. B. Field and M. Field conclude that, 'what once were localized environmental impacts, easily rectified, have now become widespread effects that may very well turn out to be irreversible.'

The world at large has need to evaluate, assess and effect accounting reporting for raw materials, energy consumption and use of natural resources which have systematically depleted the environment. Besides, the negative impact on the biodiversity through human and industrial activities and the nations' need to protect the environment, have made for global regulations. These regulatory environmental laws however require only voluntary disclosure in financial statements of environmental information on industrial emissions, degradations, industrial wastages and all activities which impact negatively on the environment. As a result of the great impact on the ecology of oil and gas producing environment of the Niger Delta in Nigeria, which has caused political unrest in the area, Owolabi (2007:63) is of the opinion that the political unrest in the Niger Delta cannot be wished away until there is a policy to incorporate environmental concerns into the nation's oil and gas industry planning, management and decision making. On environmental costs, he concludes that 'Costs and benefits need to be properly attributed, a clear distinction made between the generation of income and the drawing down of capital assets through resource depletion or degradation.'

Notable studies in environmental accounting are the Ontario Hydro Full Cost Accounting (1993) and the AT &T Green Accounting of the U.S. Environmental Protection Agency (1993). Also, the industrial green substance emissions (Carbon dioxide, Methane and Hydro fluorocarbons) and the penalties resulting from the Kyoto Protocol (December 1997) have made it a requirement for corporate organizations to take serious considerations and actions on corporate capital projects and investments.

In the light of the background of increasing environmental attention, and the fact that the oil and gas sector, the mineral extractive and indeed the manufacturing sectors have profound production impact on the environment, the study has explored an assessment of Environmental Accounting in these economic sectors in Nigeria. This is expected to facilitate effective and efficient costs measurement and reporting for corporate decision making.

Aside of the introductory chapter one, chapter two dwells on literature review of environmental accounting contemporary issues, conceptual framework and observed gaps. Chapter three defines the methodology covering research design, population of study, sampling technique, description and measurement of the variables. Whereas data analyses and study presentations are covered in the fourth chapter, the fifth and final chapter presents the summary of findings of study, conclusions and recommendations.

1.2 Statement of the Problem

Canada, Norway, The Netherlands, the United Kingdom and the United States of America have led in the pursuit of degradation and pollution prevention, control and the need for environmental safety (Skillius, A and Wennberg, U: 1998:54-59; IFAC: 2005:9). Also, leading developing nations are Zimbabwe, Namibia, The Philippines and Indonesia. They have

led in championing policies to address need for accounting and accountability for environmental costs. The need for corporate organizations to develop environmental cost responsiveness and to disclose in annual financial reports environmental information has become of great importance.

The statement of the problem is that conventional approaches of cost accounting have become inadequate since conventional accounting practices have ignored important environmental costs and activities impacting consequences on the environment. Corporate neglect and avoidance of environmental costing leave gap in financial information reporting. There is no completeness and correctness of fair view to users of financial information, such as shareholders, environmental regulatory agencies, environmentalists and potential financial investors For example, degradation or other negative impact on the environment could affect corporate financial statement such as create actual or contingent liabilities and may have adverse impact on asset values. Consequential effect on corporate organizations may result in incurring future capital expenditure and cash flows which may impinge on going concern as balance sheet secured loans may not be secure after all if land values for instance are affected by environmental factors. Also, the limited awareness of environmental costing principles and methodology has become an important issue to be addressed. If vital environmental issues and activities are not disclosed, financial statement cannot be said to reveal state of a ‘true and fair view of affairs’. It is important too, to note that ethical investors will only invest in ethical companies and therefore, will watch out for these ethically responsible companies. Ethical companies therefore, have marketing advantage if they strategically position themselves environmentally. Ethical companies stand at advantage for corporate financing. Also, the

challenge of cost and valuation for damage, depletion and degradation of the environment externalities is a critical problem whish continues to demand attention.

Since current requirement for reporting on environmental issues is voluntary, it is observed from most financial statements of corporate organizations that it has engendered disclosures of information which totally exclude environmental issues. At best where reported, are grossly inadequate. Environmental disclosures have become critically important to an informed public and financial stakeholders. Also, pertinent is the difficulty of evaluating environmental remediation for environmental degradation where environmental costs do exist.

According to Salomone and Galluccio (2001:8):

> Corporations are recognizing the benefits to their long-term corporate profitability of reducing their environmental impacts. Both the accounting and the environmental areas are concerned about how to identify, measure, report and manage environmental impacts.' It is further concluded that particularly, 'the assessment of environmental impacts on company's financial situation requires improvement in external reporting of environmental data.

The United States Securities Exchange Commission (SEC) has as requirement for listed companies, information impacting on the environment. This is also now the requirement for the European Union countries. It is therefore, considered appropriate for companies impacting on the natural environment, to design and implement environmental accounting in an emerging environmental policy changing environment. This is particularly critical for the Oil & Gas sector (prospecting and producing), the downstream sector (refining and distribution) and the manufacturing sector which impact heavily on the environment in Nigeria. Also, there should

be environmental considerations in corporate decision making for capital projects and investments.

This study focuses on Nigeria Oil & Gas and manufacturing sectors which are recognized as causing heavy degradation on the environment. For emphasis, the problem is that the Nigerian business environment has yet to recognize and design environmental accounting for environmental information and issues of raw materials, energy consumption and use of natural resources which have systematically depleted the environment. This makes for relevance of this study.

1.3 Research Questions

The questions arising which are addressed in this study are:

1. To what extent of reasonableness are environmental capital projects and investments integrated into environmental cost consideration for purpose of internal decision in companies in Nigeria?
2. To what extent are environmental operating expenses tracked independently of other operating expenditure?
3. What internal barriers affect the ability of the companies to collect environmental cost information?
4. To what extent are there disclosures on environmental issues in Annual Reports and Financial Statements?
5. To what extent is environmental costs development in Nigeria attaining prescribed standards?

6. To what level of adequacy are policy regulations on environment in Nigeria to ensure control and prevention of environment degradation and pollution?

1.4 Objectives of the Study

The broad objective of the study is to investigate best practice of environmental accounting among Oil & Gas and manufacturing companies currently operating in Nigeria. The specific objectives of the study are to:

i. Assess the independence of tracking of all costs impacting on the environment.

ii. Assess the efficiency and appropriateness of environmental costs reporting and disclosure.

iii. Ultimately, evolve and provide conceptual bases and design for cost and management accounting and disclosure in financial reporting of environmental information.

1.5 Research Hypotheses

The following Null Hypotheses were tested in order to achieve the stated objectives of this study:

1. H_0. Environmental expenditures are not charged independently of other expenditures in the Oil & Gas and Manufacturing sectors.
2. H_0. The non-application of environmental cost accounting has significantly affected the tracking of externality costs in the Oil & Gas and Manufacturing sectors
3. H_0. The application of environmental accounting practice in the Oil & Gas and Manufacturing sectors does not impact on company performance in Nigeria.

4. H_0 Environmental accounting disclosure does not take the same pattern among the companies in Nigeria.

1.6 Significance of the Study

The significance and justification for this study among others are firstly, to engage corporate organizations to adequately provide for environmental protection in their internal policies on investments and projects which impact on environment. This approach will facilitate protection of the eco-efficiency and competitiveness among corporations in all productive sectors of the economy. The study will facilitate environmental cost reporting responsiveness and disclosure to investors and environmental regulatory bodies. The study will also assist in efficient cost valuation of environmental remediation and compensation to affected communities particularly the Oil & Gas areas of the Niger Delta in Nigeria by corporate bodies impacting on the environment. A design and conceptual bases for environmental cost accounting and disclosure in corporate financial statement will facilitate efficient valuation of degradation in affected communities. Besides, it is beneficial to corporate organizations as ethical investors and the environmentally conscious general public will watch out for ethical responsible companies.

This study will assure commitment of the corporate organizations in Nigeria to international agreements on environmental regulations which will in turn assure sustainable development of environment and the eco-system in Nigeria. The study should stimulate national policies and programmes for the effective transfer, access and development of environmentally sound technologies in line with Kyoto Protocol requirement in Article 10 and also specified in Article 4, par.1 (c) of the United Nations Framework on Climatic Change

(1992). The study is relevant for improved System of National Accounts (SNA) for National Income computations considering environmental renewable and non-renewable natural resources. It will further enhance research in environmental accounting.

It is hoped that this study will evaluate the challenges and prospects facing organizations with regard to designing environmental accounting concepts and reporting. Ultimately, environmental accounting disclosure is paramount in corporate organizations in Nigeria and elsewhere as it has become an issue of concern at the global level.

1.7 Scope of the Study

This study carried out investigations spanning through mainly the Oil & Gas and manufacturing sectors. The study investigated the manufacturing companies among listed companies in the Nigeria Stock Exchange namely the agricultural, breweries, automobile and tyres, building materials, chemicals & paints and conglomerates listed in the Nigeria Stock Exchange Market considered as environmental polluters. The Oil & Gas sector comprised of companies in the upstream as well as marketing and distributions. There are 215 companies in their varied economic sectors from which samples are selected. The modality of this selection is reported in the section on Research Methodology.

1.8 Research Limitations

Environmental risks which have been limited to legal claims for damages and land remediation have not been considered as accounting issues. This has partly been responsible for the financial sector ignoring of environmental accounting. Environmental costing and reporting is much more than claims for damages. There is lack of environmental accounting

information in corporate reporting which has been attributed to several causes. Lascelles (1993) in Skillius and Wennberg (1998:7) identify that the financial sector does not see environmental issues as separate moral issue rather as one of the several phenomena affecting business which may be temporal. Skillius and Wennberg are also of the opinion that the financial sector does not consider the pricing of natural resources as solution to the threatening future shortage of environment resources and sustainable development. It was also explained that environmental accounting has not been fully appreciated, and that their effect are yet to be accurately measured. Lascelles, Schmdheiny and Zorraquin (1996) in Skillius and Wennberg (1998:6) also made the point that the financial sector does not agree to lack interest in environmental accounting, but that environmental performance and improved financial performance need to be more clearly designed.

A critical limiting factor for this study was that Annual Reports and Financial Statements for estimated sample size included only the companies which are listed in the Nigeria Stock Exchange market (NSE) whose annual reports are statutorily published and made available to the general public. There were limited or no information about companies which are not public quoted companies since they are not required statutorily to make available to the public their annual reports. Besides, even when quoted in the Stock Exchange, quite a number of companies still do not have environmental data or information reported in financial statements. Another limiting factor is the short period of study which covered only ten years (1997 – 2006). This study however carried out investigations on 132 companies which gave an opportunity for a reasonably large sample size.

1.9 OPERATIONAL DEFINITIONS OF TERMS

The following operational terminologies are in consonance with the US Environmental Protection Agency (1995b:31-37) and global literatures on Environmental Accounting.

Environmental Accounting

This has three distinct meanings as:

- Environmental accounting in the context of national income accounting, which refers to natural resource accounting. These entail statistics about a nation's or region's consumption of natural resources. It also takes into account the extent, quality and valuation of natural resources which are either renewable or non-renewable.
- Environmental accounting in the context of financial accounting usually refers to the preparation of financial reports to external users using Generally Accepted Accounting Principles (GAAP). This is financial reporting to external users conveying the impact on environment and activities impacting on eco-efficiency.
- Environmental accounting as an aspect of management accounting serves business managers in making capital investment decisions. This entails costing determinations, process/product design decisions, performance evaluations and a host of other forward-looking business decisions. It also conveys impact on the environment.

Environmental Cost Accounting

This is a term used to refer to the addition of environmental cost information into existing cost accounting procedures and/or recognizing embedded environmental costs and allocating them to appropriate products or processes.

Full Cost Accounting is a term often used to describe desirable environmental accounting practices. In management accounting 'full costing' means the allocation of all direct and

indirect costs to a product or product line for the purposes of inventory valuation, profitability analysis and pricing decisions.

Life Cycle Assessment

This is a holistic approach to identifying the environmental consequences of a product, process, or activity through its entire life cycle and to identifying opportunities for achieving environmental improvements. US EPA (1993; 1995b:32) have specified the four major stages in the life cycle of a product, process, or activity as raw materials acquisition, manufacturing, consumer use/reuse/maintenance and life cycle/waste management. By itself, life cycle assessment focuses on environmental impact and not costs.

Life Cycle Cost Assessment is a term that highlights the costing aspect of life cycle assessment. It is regarded as a systematic process for evaluating the life cycle costs of a product, process, system, or facility by identifying environmental consequences and assigning measures of monetary value to those consequences.

Private Costs are the costs for which a business is held responsible. They are the costs incurred by a business which directly affect the business bottom line. These are also referred to as internal costs.

Societal Costs are those costs impacted on the environment which results from company's production activities. These costs do not directly affect the company's bottom line. Societal costs are also known as external costs or externalities.

Costs allocation refers to accounting procedures and systems for identifying, measuring and assigning costs for internal management purposes.

Capital budgeting which is also known as Investment Analysis is the process of determining a company's planned capital investments.

Emissions Trading (or Cap and Trade)

Emissions Trading (or Cap and Trade) is an administrative approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants.

Process/Product Design refers to the process of developing specifications for products or processes taking environmental costs and performance into consideration.

Upfront Costs include pre-acquisition or pre-production costs incurred for processes, products, systems or facilities e.g. R & D costs.

Voluntary Costs represent costs incurred which are not required or necessary for compliance with environmental laws. These go beyond compliance.

Gray zone costs refer to costs which are not clearly or wholly environmental in nature but may be health and safety costs, risk management costs, production costs, operations costs etc.

Renewable natural resources are products of non-geological and short-term resource cycles. They are renewable because they are continuously reproduced if the ecosystem remains viable.

Non-renewable natural resources are natural products of much longer resource cycles. This natural resources are used up once in a geological time.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 THEORY, CONCEPTS AND MODELS

2.1 SOCIAL ACCOUNTING

The literature reveals a number of works which explain Voluntary Social Environmental Reporting (SER). Several concepts and models have emanated from the social, economic and management perspectives which address environmental responsibility and accountability; Concepts such as the Social Contract Concept, Quality of Life Concept, the Stakeholder Theory, the Political Economy Theory and the Risk Society Framework. Owolabi (2007:60) observed that there is high degree of awareness of environmental issues in the oil and gas sector in Nigeria. In his work, he identified the Social Contract Concept and the Quality of Life (QOL) Concept of SER.

Social accounting has been synonymously used as Social and Environmental Accounting, Corporate Social Reporting, Corporate Social Responsibility Reporting, Non-Financial Reporting and Sustainability Accounting. Gray, Owen and Maunders (1987:ix) has defined Social accounting as ‘the process of communicating the social and environmental effects of organizations' economic actions to particular interest groups within society and to society at large.’ Crowther (2000:20) also defines social accounting sense as ‘an approach to reporting a firm’s activities which stresses the need for the identification of socially relevant behaviour, the determination of those to whom the company is accountable for its social performance and the development of appropriate measures and reporting techniques.’

Wiki (2009) recognizes social responsibility as an 'ethical or ideological theory that an entity whether it is a government, corporation, organization or individual has a responsibility to society.' It stated that Corporate Social Responsibility (CSR) also 'imply that corporations have an implicit obligation to give back to society (such as is claimed as part of corporate social responsibility and/or stakeholder theory)' The World Business Council for Sustainable Development (cited in Obalola, 2008:542) in 1998 conceived CSR 'as the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the work force and their families as well as of the local community and society at large.' UNIDO Position paper on Corporate Social Responsibility asserts that:

> … this means that, through CSR, companies can detect and overcome inefficiencies in their production process, continuously upgrade the quality of their products, and gradually develop their expertise in marketing and sales in an ever-wider market place. By doing so, they eventually improve their environmental and social performance and, thereby, their overall competitiveness. (UNIDO Position paper on Corporate Social Responsibility)

2.1.1 The Social Contract Concept

The Social Contract concept of CSR has been well acknowledged in many past works. Heard and Boles (1981:247-254), Gray et al (1988), and Owolabi (2007:58) agree that Social Contract Concept is responsible for Corporate Social Reporting (CSR). Donaldson (1982) opines that social contract is central to social change and reforms. Deegan (1998) associates the

Social Contract expectation with the Legitimacy Theory where "there is a social contract between the organization and those affected by the organization's operations".

2.1.2 Legitimacy Theory as pertaining to social and environmental disclosure

Campbell, Craven, and Shrives, (2003:555-581) examined perceived legitimacy gap alongside of Voluntary Disclosure requirement for social and environmental issues and costs. This work examined the extent to which Voluntary Disclosure represent an attempt to close perceived legitimacy gap. This has also been evaluated by Lindblom (1994), Gray, et al (1995:47-77), Suchman (1995) and O'Donovan. (2002:344-371). Aderinto (1980) in Owolabi (2007:67) had observed two conflicting opinions of the legalistic and the social responsibility views and would appear to pitch tent with the latter view. Aderinto (1980) expressed that organizations' purpose was to have investments for profits and not expected to have a social conscience for social welfare and obligations. Sada (1988:27-37) differs from that view; he expressed that it was rather increasingly acceptable to have corporate organizations clearly exhibit a sense of public obligation to the social cost of their economic activities. Legitimacy Theory presupposes a relationship of understanding between different parties and reciprocal responsibilities. 'Organizations operate within certain bounds imposed by society in order to enjoy continued access to products and resource markets' (Campbell et al: 2003:559). The works of Campbell et al (2003) referred to above, captured voluntary social disclosure over a longitudinal period in excess of 20 years (1975-1997) in three companies (tobacco, brewing and retailing) in the UK. It was concluded in the work that:

> It is argued that companies in these industries have differing motivations towards legitimation owing to the different perceptions that society has with

> regard to their activities (and their social and ethical behaviour) and how the management of the companies themselves perceive social opinions about them.

Mathew (1993) opines that legitimacy theory arises from the concept of a social contract being established between companies and society and according to Solomon (2005:1), Hart and Owen (1992) Deegan and Rankin (1996:50-57), legitimacy theory has been proffered as an explanation why companies voluntarily disclose SER. Although, the legitimacy theory (LT) is most referred to, this has focused mainly on the social reporting aspect of accounting. This has however, not focused on environmental costs and financial reporting.

2.1.3 Quality of Life theory

Quality of Life (QOL) of CSR is defined by Hass (1999) in Owolabi (2007:58) as:

> A multidimensional evaluation of an individual's current life circumstances in the context of the culture in which they live and the values they hold. QOL is primarily a subjective sense of well-being encompassing physical, psychological, social and spiritual dimensions. In some circumstances, objective indicators may supplement or, in the case of individuals unable to subjectively perceive, serve as a proxy assessment of QOL.

According to Dierks (1979:87-107) in Owolabi (2007:60), the theory asserts that unrestrained industrial production for economic development has not only resulted in increase of social costs in heavy proportions, but also evident in environmental pollution and social ills. The adverse effect has triggered of society's negative attitude toward industrialization. Business

organizations are therefore regarded as villains since they are responsible for degradation of the environment and all the social ills. It is expected that to enhance the QOL of the society should be a primary determination of government policies (Schuessler and Fisher, 1985).

2.1.4 Risk Society Theory

Unerman and O'Dwyer (2004) and Solomon (2005:1) have portrayed so well 'a society faced with high consequence Social, Ethical and Environmental (SEE) risks'. This view was however credited as first been mooted by Beck (1992; 1999). In the opinion of Solomon, this is another lens view to explain Voluntary SER. Solomon (2005:1) explains that Giddens' (1990) and Lupton's (1999) works explain that 'society was becoming characterized increasingly by a decline in trust in institutions and organizations in general'. Solomon (2005) explains further that 'it was this decline in trust which was exaggerating the level of risk in society'; and that 'reducing perceived growth in society risk was rebuilding trust as a means of risk reduction'.

Empirical research carried out by Solomon and Darby (2005:27-47) was series of interviews with company employees from the U.K. FTSE 100 to uncover the philosophy and theory motivation for voluntary SER. They aimed to discover i) whether a risk society theoretical framework was an appropriate lens through which to view voluntary SER, and ii) whether SER acted as a risk management mechanism for reducing risk and anxiety, nurturing trust and engaging with shareholders, within a risk society theoretical framework.

Among severalties of factors for SER verified by Solomon and Darby (2005:27-47) were:

i. Reducing Risk and Anxiety by nurturing Trust, evidence supporting the Risk Society Theoretical Framework,

ii. Trust and Financial Performance, The Philosophy underlying Voluntary SER, and

iii. Evidence supporting a Legitimacy Theoretical Framework for Voluntary SER

Findings of Solomon and Darby (2005:27-47) on Risk Society factor was that Interviewees considered that they needed to build trust between themselves and their stakeholders and viewed SER as a mechanism for promoting trust. The researchers also identified a strong link between reputation risk and trust as drivers of SER and also that SER was a Social and Environmental Accountability (SEA). The researchers also observed that it was implicit in the interviewee discussion of how SER could nurture trust among stakeholders and that Social, Ethical and Environment (SEE) accountability would reduce anxiety among consumers and stakeholders. Although the researchers also confirmed respondents' fear of loss of reputation of stakeholders was capable of impacting adversely on corporate profitability, from finding, they agree that, 'it seems that the Risk Society Theory encapsulate previous theories.' They however conclude that 'no one theoretical framework is sufficient to view Voluntary SER clearly and that the Risk Society Framework was similarly insufficient in itself. The Risk Society motive was however seen as a strong lens to view SER. It is the premise of Risk Society Framework that the Eco-efficiency Framework and Environmental Quality Cost Model of environmental accounting, the subject of this study are hinged. Also, it is rightly observed by UNIDO Position paper on Corporate Social Responsibility that CSR has frequently been misleadingly equated simply with 'corporate philanthropy' and 'charitable giving', which in turn are often separate from their core business and without an underlying strategic plan behind it. Environmental accounting focuses on environmental costing and disclosure for accountability. Environmental accounting which is a subset of social accounting focuses on the cost structure and environmental performance of a company. It is the

preparation, presentation, and communication of information related to an organization's interaction with the natural environment. Wikipedia (2009). 'More typically, environmental accounting describes the reporting of quantitative and detailed environmental data within the non-financial sections of the annual report or in separate (including online) environmental reports. Such reports may account for pollution emissions, resources used, or wildlife habitat damaged or re-established.' Wikipedia (2009)

2.2 ENVIRONMENTAL ACCOUNTING

The study of Nagle (1994:243), on environmental accounting reveals that corporate managers are placing high priority on environmental accounting. Environmental accounting as a prevalent subject in the international community is not yet a priority in Nigeria. B. Field and M. Field (2002) explain pertinent aspects of environmental degradation and costs as those including emissions into the air, water and land. Also, aspects of untreated domestic waste outflows into rivers and coastal oceans, quantities of solid waste that must then be disposed of, perhaps through land spreading or incineration. Pollution include airborne SO_2 emissions from power plants by stack-gas scrubbing which leaves a highly concentrated sludge and degradation which incorporates midnight dumping, illegal dumping along the sides of roads or in remote areas.

Field (2001) and B. Field and M.Field have done tremendous work on the economics of natural resources and in this instance explored the approach of benefit–cost analysis through discounting of future based input and output values of environmental projects and activities. Measuring benefit-costs analysis has been essentially through regulatory Evaluation Impact Assessment (EIA) study on the environment. Partridge (2003), in his works condemn the

whole essence of placing monetary value above other human virtues in environmental issues. He also recognized the absurdity of discounting and discountenancing future environmental impact on human values.

From investigations with the Federal Ministry of Environment, EIA study conducted by the oil & gas (exploration and producing), manufacturing and other companies having activities that impact on the environment has been accepted as a regulatory requirement in Nigeria. Achieving effective EIA is however froth with uncertainties in Nigeria since the objective estimation of input and output values is not so reliable. Besides, there is excessive fluctuation in the discount factor for purpose of benefit-cost analysis. Non-available market values for certain natural resources costs and benefits such as the fauna, fishing ponds or rivers, among others, makes it extremely difficult to place monetary value on the factors of measurement. This study is aimed at enhancing regulatory EIA for purpose of environmental impact project benefit-cost analysis.

Hansen and Mowen (2000) and the ICF Incorporated (1996) in Ontario Hydro study have made tremendous effort to shape the direction for environmental accounting or full cost accounting also referred to as green accounting in U.S.EPA (1995a) in the AT & T Study.

Environmental Accounting Defined

At all times it is important in decision making to provide accurate costs information. The consciousness and need to protect the environment will make for environmental costs to be identified, accurately measured and reported. Besides, certain environmental costs have previously been reported conventionally along with companies' overheads before allocation to products or processes. Sometimes they have been totally left out of financial reporting because they constitute externality social costs which did not form part of bottom-line financial

reporting. Adverse effect on the society known as environmental social costs, or externality costs is a critical issue for consideration. This is considered an issue of responsibility for environmental accountability. Externality costs are therefore internalized as part of environmental cost accounting.

The term environmental cost does not only refer to costs paid to comply with regulatory standards, costs which have been incurred in order to reduce or eliminate releases of hazardous substances but all other costs associated with corporate processes which reduce adverse effect on the environment. Several definitions have been proffered for Environmental Accounting.

Hansen and Mowen (2000:668) have defined environmental costs 'as costs associated with the creation, detection, remediation and prevention of environmental degradation' At AT&T, according to the US EPA (1995a:2), Green Accounting or Environmental Accounting is defined as: 'Identifying and measuring the costs of environmental materials and activities and using this information for environmental management decisions. The purpose is to recognize and seek to mitigate the negative environmental effects of activities and systems'. Howes (2002:4) defines Environmental Accounting as: 'The generation, analysis and use of monetarized environmentally related information in order to improve corporate environmental and economic performance'

In the opinion of Howes, Environmental Accounting does not only focus on internal and external environmental accounting but links environmental and financial performance more visibly. Environmental accounting assists in getting environmental sustainability embedded within an organization's culture and operations. The aim is to provide decision makers with the information that enable the organization to reduce costs and business risks and to add value.

We are however, cautioned on use of terminologies. Since terminologies are not standardized, the broad term Environmental Accounting might differ among organizations and nations. Environmental Accounting (EA) is variously called Environmental Cost Accounting (ECA), Environmental Management Accounting (EMA), Full Cost Accounting (FCA) and Total Cost Assessment (TCA) among others. IFAC (1998) Management Accounting Concepts and IFAC (2005:19) International Guidance Document on Environmental Management Accounting have proffered definitions as:

Environmental Management Accounting (EMA) which is defined as:

> the management of environmental and economic performance through the development and implementation of appropriate environmental-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management. IFAC (1998; 2005:19)

Also, a complementary definition given by the United Nations Expert Working Group (representing 30 nations plus) on EMA and the United Nations Division for Sustainable Development (2001) which highlights both the physical and monetary side of EMA, broadly defines EMA as the 'identification, collection, analysis and use of two types of information for internal decision making, namely: physical information on the use, flows and destinies of energy, water and materials (including wastes) and monetary information on environmental-related costs, earnings and savings.'

The types of information essentially relevant in EMA are basically two, physical information and monetary information. To correctly assess costs in an organization, physical

information which should be brought under consideration are data on material usage, personnel hours and other costs drivers. In IFAC (2005:7, 20) it is observed that the 'use of energy, water and materials, as well as the generation of wastes and emissions, are directly related to many of the impacts organizations have on their environments.' Also, that 'material purchase costs are a major cost driver in many organizations.' What is of interest is that to constantly track and reduce the amount of energy, water and materials used by manufacturing and other operations organizations will have direct environmental benefits, because the extractions of natural resources have impact on the environment. Depending on use, monetary data will relate to input materials, waste streams, process or equipment, product or service lines for the purpose of investment appraisal, assessment of total annual costs or budgeting. Others may be monetary information from suppliers, customers/ clients and other elements of supply chain.

Environmental cost accounting employs terminologies such as Full Cost Accounting, Full Cost Environmental Accounting, Total Cost Accounting, True Cost Accounting, Total and Cost Assessment, as indicated earlier. U.S EPA (1995b:30-32) further defines various environmental costs terminologies, viz:

Environmental Cost Accounting

This is a term used to refer to the addition of environmental cost information into existing cost accounting procedures and/or recognizing embedded environmental costs and allocating them to appropriate products or processes.

Full Cost Accounting (FCA)

> This is a term often used to describe desirable environmental accounting practice. In the accounting profession, Full Cost Accounting is a concept and term used in various contexts. In management accounting, Full Costing means the allocation of all direct and indirect costs to a product or process for the

purposes of inventory valuation, profitability analysis, and pricing decisions. U.S EPA (1995b:31)

Full Cost Environmental Accounting embodies the same concept as Full Cost Accounting and highlights the environmental elements.

Total Cost Accounting is often used synonym for full cost environmental accounting

Total Cost Assessment (TCA) represents the process of integrating environmental costs into capital budgeting analysis. 'It has been defined as the long-term, comprehensive financial analysis of the full range of private costs and savings of an investment'.

Skillius and Wennberg (1998) rather expatiated more on Full Cost Accounting (FCA), Total Cost Assessment (TCA) and Life Cycle Costing (LCC) as defined in GEMI (1994) as three techniques by which environmental dimensions are incorporated into accounting and the financial system.

Total Cost Assessment is used to assess pollution prevention projects using environmental cost data, appropriate time horizons and standard financial indicators. TCA utilizes FCA techniques to properly assign environmental costs and savings to all competing projects, products or processes as part of capital budgeting. Under TCA, decision makers will use traditional financial measures in determining the feasibility of an investment project, such as Net Present Value, Internal Rate of Return, Profitability Index, and Payback Period. Skillius and Wennberg (1998:3) describe this as a technique to identify, quantify and allocate the direct and indirect environmental costs of on-going company operations as follows Direct costs (e.g. capital, raw materials); Hidden costs (e.g. monitoring, compliance reporting); Contingent liability costs (remedial liabilities); and Less tangible costs (e.g. public relations, goodwill).

Again, making reference to Skillius and Wennberg (1998) on TCA and LCC, varied definitions are given below.

Life Cycle Costing (LCC)

Developed from Life Cycle Analysis (LCA), Life Cycle Costing is a systematic approach for estimating the environmental consequences (i.e. waste generation, emissions and discharges), energy and resource usage associated with a product, process or operation throughout all usages of the life cycle. Through LCC managers assign a cost to impact on environment quantified in the Life Cycle Analysis and sum these costs to estimate the net environmental cost from a product, process or project. The difference in TCA is that it may include private (internal) and social (external) costs and benefits of an investment.

It has been observed that new costs which are emerging from study of environmental activities, must be recognized by the cost accounting system, so that product costs remain accurate enough to facilitate sound decision making. For example, many superior environmental projects are often not identified as environmental because they also convey operating benefits. Skillius and Wennberg (1998)

From all definitions, it seems that Environmental Accounting is not the effect of environmental factors on the production sectors and productivity as generally considered by some opinions. Rather, it is costs identification and assessment of the effect of technology and human productivity on the natural environment (bio-diversity) and the impact of environmental degradation. It is also the consequent accountability for the environment and environmental protection. Furthermore, Salomone and Galluccio (2001:8) consider information as "information expressed in qualitative terms (only descriptive) and quantitative terms (physical and financial) connected to the impact that the company's activity has on the natural

environment, and that can have consequences on the financial and economic structure of the company". They conclude that "environmental information is that which makes the managerial context described in the Annual Report more understandable and complete." Hansen and Mowen's (2000) definition is critical in this study. It emphasizes the accounting for costs which relate to the creation, detection, remediation and prevention of environmental degradation.

According to Salomone and Galluccio, key indicator areas of most relevant environmental information identified by the World Business Council for Sustainable Development and the Global Reporting Initiative are:

- environmental policy
- environmental impacts
- environmental management systems
- environmental targets
- ecological products
- reference and/or cross reference to the Environment Report
- environmental financial information, such as operative expenses and environmental investments; extra-ordinary environmental costs; environmental liabilities; accounting policies of environmental items; environmental commitments and contingencies; and
- environmental insurance; tangible and intangible environmental assets.

2.2.1 SIGNIFICANCE OF ENVIRONMENTAL MANAGEMENT ACCOUNTING

Significance of EMA are identified as not only involving information provision, management planning and control, but an adaptation from the German Environment Ministry

(2003) identifies three broad benefits of EMA as emphasis on Compliance, Eco-efficiency and Strategic Positioning. EMA supports environmental protection through cost efficient compliance with environmental regulations and self-imposed environmental policies. Examples are in planning and implementing pollution control investments or projects. It involves also, investigating and purchasing cost efficient substitutes for toxic materials and the reporting of environmental wastes and emissions to regulatory agencies.

On benefits of eco-efficiency, EMA supports the simultaneous reduction of costs and environmental impacts through more efficient use of water and materials in internal operations. On Strategic Planning, EMA supports the evaluation and implementation of cost-effective and environmentally sensitive programmes to ensure organizations' long-term strategic position. Examples are working with suppliers to carry out the design of products and services for environmentally responsive market, and to estimate internal costs of likely future regulations. Strategic planning may also involve reporting to stakeholders such as the customers, investors and the local communities.

Conventional approaches of costing have become inadequate because they ignore important environmental costs and potential cost savings. Gray and Bebbington (2006) emphasize therefore, that environmental accounting is not only about accounting for the environment, rather it is also to the extent that environmental issues can be reflected in conventional accounting practice. This is with the view of improving the condition of the natural world such as reduced land degradation and pollution abatement which enhance sustainable development.

2.2.2 Land degradation

Land degradation according to Wikipedia (2006a) 'is a human induced of natural process which negatively affects the capacity of land to function effectively within an ecosystem by accepting, storing and recycling water, energy, and nutrients'. The causes of land degradation are identified as anthropogenic and mainly agricultural related. They include:
land clearing and deforestation, agricultural depletion of soil nutrients, urban conversion, irrigation and pollution.

Further description and impact on land resulting from degradation according to Wikipedia (2006a) state as follows:

> Severe land degradation affects a significant portion of the earth's arable lands, decreasing the wealth and economic development of nations. Land degradation cancels out gains advanced by improved crop yields and reduced population growth. As the land resource base becomes less productive, food security is compromised and competition for dwindling resources increases, the seeds of potential conflict are sown. Thus a downward eco-social spiral is created when marginal lands and nutrients are depleted by unsustainable land management practices resulting in lost soil stability leading to permanent damage.
>
> We often assume that land degradation only affects soil productivity. However, the effects of land degradation often have more significant impacts on receiving water courses (rivers, wetlands and lakes) since soil, along with nutrients and contaminants associated with soil, are delivered in large quantities to environments that respond detrimentally to their input. Land degradation

therefore, has potentially disastrous impacts on lakes and reservoirs that are designed to alleviate flooding provide irrigation and generate hydro-power.

2.2.3 Pollution

Pollution has been defined in Wikipedia (2006a) ‘as the release of chemical, physical, biological or radioactive contaminants to the environment’. Pojman (1999:11) says pollution is ‘unwanted substances as contaminations’, also citing the National Academy of Sciences definition as ‘undesirable change in the physical, chemical, or biological characteristics of the air, water or land that can harmfully affect health, survival, or activities of human or other living organisms’. According to Wikipedia principal forms of pollution are:

air pollution, which is the release of chemicals and particulates into the atmosphere. Common examples include carbon monoxide, sulphur dioxide, chlorofluorocarbons (CFC), and nitrogen oxide produced by industries and motor vehicles. Ozone and smog are formed as nitrogen oxides and hydrocarbons react to sun.

- Water pollution affects oceans and inland bodies of water. These may include organic and inorganic chemicals, heavy metals, petrochemicals, chloroform and bacteria. Water pollution may also occur in the form of thermal pollution and the depletion of dissolved oxygen.

- Soil contamination often occurs when chemicals are released by spill or underground storage tank leakage. Contaminants include hydrocarbons, heavy metals, herbicides, pesticides and chlorinated hydrocarbons.(Wikipedia 2006a)

Other forms of pollution include radioactive contamination, noise pollution, light pollution and visual solution.

2.2.4 LEVELS OF ENVIRONMENTAL ACCOUNTING

The uses of environmental accounting according to U.S EPA (1995b:9) arise in three distinct levels, namely:

1. **Managerial Accounting**

This is internal use of corporate organizations, division, facility, project or system. Managerial or management accounting here refers to the use of a set of cost and performance data about environmental costs, decisions and operations.

2. **Corporate Financial Accounting Reporting**

Corporate financial reporting is generally, regulated by the Securities Exchange Commission (SEC) and the Generally Accepted Accounting Principles (GAAP). Environmental accounting in this context refers to the estimation and reporting to the public and regulatory agencies of environmental liabilities and financial material environmental costs.

3. **System of National Accounts (SNA)**

The focus is the nation's macro-economic measures of the National Income Accounts in which economic indicators such as Gross Domestic Product are measured. In this context environmental accounting can refer to consumption of the nation's natural resources in monetary form. One flaw as remarked by Hecht (1999) is that the cost of environmental protection such as the watershed protection of the forests and crop fertilization that insects provide cannot be measured in the National Income Account.

Identifiable also, is the issue of depreciation treatment in compiling the National Income Account. In this case whereas depreciation are provided for physical assets consumed

in the cause of production, but in the case of the consumption of natural resources, these are rather treated as increasing national income. The example of a country that harvests its forest resources unsustainably will have its national income show high national income a few years from natural resources, but will not reflect the destruction of its productive forest assets. This is an interesting area of environmental accounting upon which there is on-going effort at the United Nations in the System for Integrated Economic and Environmental Accounting (SEEA), an option to the current System of National Accounts.

Quite a number of nations' governments are incorporating environment related data into national accounting. In 2003, the European Commission incorporated into national accounting reporting the requirement to include a definition of the types of expenditures under Total Current Expenditure on Environmental Protection. European Commission members thereafter will need to report the data to Eurostat, the statistical office of the European Union. Besides, this is a requirement of the ISO 14001 which is the Environmental Management System standard.

According to IFAC International Guidance Document on Environmental Management Accounting (2005:73), the United Nations has in 1993 and through subsequent reviews of guidelines outlined the types of physical and monetary information useful for environmental accounting at the national level. We are informed that the goal of the UN SEEA is to allow assessment of interactions between the natural world and the economy. It is also, to provide information to support the design of integrated social, economic and environmental government policies. The UN SEEA has adopted the Classification of Environmental Protection Expenditures system (CEPE, 2003) which was developed by the European Union. CEPE reports broad environmental domains such as wastewater management, waste

management and subsequently into types of environmental activities Waste and Emission Treatment, Prevention Management, Research and Development. The Australia Bureau of Statistics collects information along the requirement of the UN SEEA.

2.2.5 Problems of environmental accounting

Hecht (1999:14) opined that "Building a nation's economic use of the environment (and environmental degradation) into its accounts is a response to several perceived flaws in the System of National Accounts (SNA)…" Hecht identifies the difficulties of environmental accounting in nations as:

i. Cost of environmental protection cannot be identified. It is cited for instance, that money spent to put pollution control devices on smokestacks will increase GDP, even though the expenditure is not economically productive.

ii. Certain environmental goods are not marketed even though they provide economic value, for instance fuel wood gathered in the forests, meat and fish gathered for consumption. Water for drinking and irrigation are not priced in themselves apart from the technology applied to make the water available.

iii. When certain nations include these resources in their System of National Accounts, no standard practices exist for comparability.

Hecht (1999:14) observed that nations incorporate into their national accounts differently depreciation of manufactured capital and natural capital. That whereas buildings or machines are depreciated in the accounting conventional manner, but the consumption of

natural resources is treated as income. A major challenge which is yet to receive a consensus among nations is valuation of natural resources resulting from resource depletion for the balance sheet (Statistics Canada:2006:1)

Quite a number of natural resource-dependent countries have commenced developing environmental accounting, namely: Norway in 1970; Namibia in 1994; The Philippines in 1990 and Indonesia. While standards have differed, environmental accounting practice has made certain nations' governments to focus on environmental accounting for policy-making purpose.

Environmental Accounting for corporate organizations

Planning and decision making on Environmental Accounting in industrial sector, requires a commitment to Full Cost Accounting (FCA) principle. FCA in the Ontario Hydro in 1993 was defined as 'incorporating environmental and other internal costs and benefits of an industry's activities on the environment and on human health and the challenge is to quantify, monetize and internalize the external costs into the companies' income measurement.' (Ontario Hydro, 1993: 3 S.C.R.327). Environmental accounting terminology uses the words such as *full, total, true, life cycle* to emphasize that conventional accounting methodology were incomplete and exclude external costs i.e. societal costs. Bailey (1991:13-29)

> Identifying environmental outlays and estimate spending levels were a major step in accounting for environment in Ontario Hydro in 1993 which was reported as:
>
> Environmental Spending as any monetary expenditure, revenue or revenue foregone, whether capitalized or charged to current operating expenses, made for Ontario Hydro for the primary reason of sustaining or protecting the environment. This includes any costs incurred for control, reduction, prevention, or abatement of

discharges or releases to the environment of gaseous, liquid, or solid substances, heat, noise, or unacceptable appearance

(Ontario Hydro in; 1993).

2.3 LEGAL FOUNDATION ON ENVIRONMENT AND ACCOUNTING

2.3.1 THE UNITED NATIONS' PROTOCOLS AND AGREEMENTS ON ENVIRONMENT

The issue of the environment has featured severally over the years at world conventions under the auspices of the United Nations Environmental Programme. At the United Nations, a list of protocols and agreements cited in Wikipedia, (2006c), have been signed in the past and recent years by nations on regulating the environment such as**:**

1. The International Convention for the prevention of pollution from ships, in 1973 and 1978 but enforced in 1983
2. The Montreal Protocol on substances that deplete the ozone layer in 1987 and enforced in 1989
3. IMO resolution A 672 (16); International Maritime Organization (1989)
4. The Basel Convention (1989)
5. The Bamako Convention (1991) at the African regional level.
6. International Tropical Timber Agreement in 1994
7. The UN Framework Convention on Climatic Change in 1992 (Adopted in December, 1997)
8. Ottawa Convention on landmines in 1997
9. ASEAN Agreement on Trans-boundary haze pollution in 2002,

2.3.2 The Kyoto Protocol to the United Nations framework on Climate Change

Follow-up to the Montreal Protocol on substances that deplete the ozone layer, adopted in Montreal in 1987, the Kyoto Protocol which was adopted in December 1997 according to the Crown Copyright Treaty Series 6 (2005) centre on climate change and implication. The protocol has provided among others in Article 3 which reads in parts:

1. The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012. Annex A list of gases in Appendix 2
2. Each Party included in Annex 2 shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol.

   Some important commitments under Article 2 Sec 1a:

Each Party included in Annex 1, in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development shall:

a.) Implement and/or further elaborate policies and measures in accordance with national circumstances such as:

(i) Enhancement of energy efficiency in relevant sectors of the national economy;

(ii) Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable forest management practices, afforestation and reforestation;

(iii) Promotion of sustainable forms of agriculture in light of climate change considerations;

(iv) Research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies;

(v) Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;

(vi) Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;

(vii) Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;

(viii) Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy. (Source: Treaty Series No.6:(2005:3-4): Kyoto Protocol to the United Nations Framework Convention on Climatic Change)

2.3.3 Accounting Guidance on Kyoto Agreement by Governments

Contained in a Press Release in December, 2004, the International Accounting Standards Board, IASB IFRIC (2004:3) states that:

1 In the light of the Kyoto Protocol described above, several governments have, or are in the process of developing schemes to encourage reductions in greenhouse gas emissions. The Interpretation focuses on the accounting to be adopted by participants in a 'cap and trade' scheme, although some of its requirements might be relevant to other schemes that are also designed to encourage reduced levels of emissions and share some of the features of a cap and trade scheme.

2 Typically in cap and trade schemes, a government (or government agency) issues rights (allowances) to participating entities to emit a specified level of emissions.(The government may issue the allowances free of charge or the participant may be required to pay for them). Participants in the scheme are able to buy and sell allowances and therefore, in many schemes, there is an active market for the allowances. At the end of a specified period, participants are required to deliver allowances equal to their actual emissions.

3 The Interpretation specifies that rights (allowances) are intangible assets that should be recognized in the financial statements in accordance with IAS 38 Intangible Assets. When allowances are issued to a participant by government (or government agency) for less than their fair value, the difference between the amount paid (if any) and their fair value is a government grant that is accounted for in accordance to IAS 20 Accounting for Government Grants and Disclosure

> of Government Assistance. As a participant produces emissions, it recognizes a provision for its obligation to deliver allowances in accordance with IAS 37 Provisions, Contingent Liabilities and Contingent Assets. This provision is normally measured at the market value of the allowances needed to settle it.
>
> Source: [IASB IFRIC (2004:3): Press Release, December]

2.3.4 Environmental Accounting Implication arising from the Kyoto Convention

The issues on environment arising from the Kyoto Convention have further implications for need for compliance to regulations and for pollution prevention and environmental protection. Besides, the Convention touches on Carbon Allowances for nations and accounting valuation for Carbon Trading among trading nations and corporate organizations affected.

The Kyoto Convention is a follow-up on the Montreal Protocol on substances that deplete the ozone layer. Nations which have assented to Kyoto Protocol and consequently corporate organizations in these nations shall individually or jointly ensure that their aggregate anthropogenic carbon dioxide equivalent emissions and greenhouse gases do not exceed their assigned amount. The target is the reduction of overall emission to at least 5% below the 1990 levels in the commitment period 2008 and 2012.

In Cap and Trade scheme, governments issue rights or allowances to participating entities to emit specified level of emissions. According to Wikipedia encyclopedia (2007:1), Emissions Trading (or Cap and Trade):

> is an administrative approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. A central authority (usually a government or international body) sets a limit or *cap* on the

amount of a pollutant that can be emitted. Companies or other groups are issued emission permits and are required to hold an equivalent number of *allowance (or credits)* which represent the right to emit a specific amount. The total amount of allowances and credits cannot exceed the cap, limiting total emissions to that level. Companies that need to increase their emissions must buy credits from those who pollute less. The transfer of allowances is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions by more than was needed. Wikipedia (2007:1)

2.3.5 EU Directive on Environmental Issues in Company Annual Reports and Financial Statements

As contained in Environmental Management Accounting, IFAC (2005:79), the European Commission in 2001, adopted a recommendation on recognition, measurement and disclosure of environmental issues in the annual accounts and reports of companies. This recommendation was to enable for reporting of high levels of environmental issues in annual accounts and reports of companies. Although EC recommendations were voluntary, but European Countries in 2003, have made the reporting of environmental issues in annual accounts and reports mandatory.

System of National Accounts is not the focus of this study though, but attention will be on corporate financial accounting reporting and managerial accounting for internal management. According to EMA in IFAC (2005:79), Green Accounting in Denmark requires EMA material accounting in companies. Companies therefore, require in their reports the following:

- data on consumption of water, energy and raw materials:

- significant types and volumes of pollutants emitted to air, water and soil;
- significant types and volumes of pollutants in production processes, waste or products.

In Denmark, green accounting and corporate reporting environmental issues are increasingly pursued. The Enterprise Act of 1989 in Norway requires that Board of Directors' Report should include information on the levels of pollution emission, contamination and details on the measures undertaken or planned in the pollution prevention activity (Roberts, 1992; Salomone and Gallucio 2001:22)

2.4 MODELS

2.4.1 MARKET VALUATION OF ENVIRONMENTAL CAPITAL EXPENDITURE

Clarkson, Yue and Richardson (2004:330-353) have examined the market valuation of environmental capital expenditure (ECE) investment related to pollution abatement in the pulp and paper industry. In their view, in order to be capitalized, an asset should be associated with future economic benefits. It was observed that investors condition their evaluation of the future of economic benefits arising from ECE on an assessment of the firm's environmental performance. It is further revealed that there are incremental economic benefits associated with ECE investment by low-polluting companies and not high-polluting companies. This work, acknowledging its limitations, have not resolved agreed standards for issues for public disclosures

The purpose of the study on Environmental Cost Accounting for Capital Budgeting by Savage, Brody, Cavander and Lach in U.S EPA (1995c:21) was to benchmark current practices of environmental accounting as they applied to capital budgeting decisions in the U.S. manufacturing companies. The study sought to provide corporate management and the public

sector an understanding of how to integrate environmental cost considerations into decisions of investments which impact on the environment. Study areas were capital budgeting process, tracking costs, costs inventory and environmental costs quantification. The study further highlights the Costs Boundaries otherwise regarded as the Environmental Cost Primer Model.

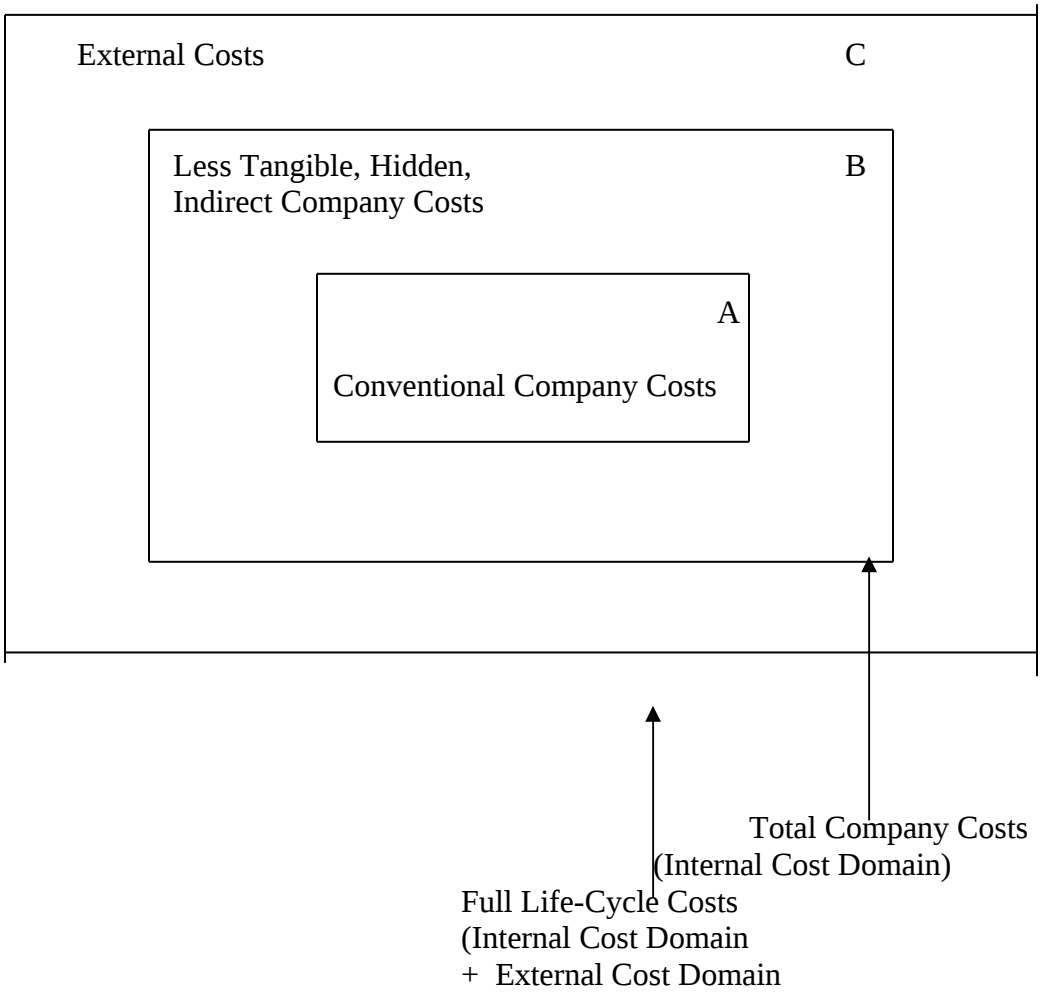
2.4.2 ENVIRONMENTAL COST PRIMER MODEL

GEMI (Global Environmental Management Initiative - 1994), and Savage, Brody, Cavander and Lach in U.S EPA (1995c) propose the Environmental Cost Primer Model - Cost Boundaries as in Figure 2.1. In order to provide guide for integrating environmental costs considerations into decisions on environmental projects, an attempt on costs delineations is made. Represented in Figure 2.1 (diagram), Box A comprises of conventional costs such as off-site waste disposal, purchase and maintenance of air emission control systems, utilities costs and perhaps costs associated with permitting of air or wastewater discharges. Box B comprises of wide-range of costs (also of savings and revenues) such as: liability, future regulatory compliance, enhanced position in green product markets, and the economic consequences of changes in corporate image linked to environmental performance.

Both Boxes A and B comprise the company's Internal Costs which are also called Private Costs for which the company is held responsible since consequences of costs affect company profitability performance bottom-line. Box C comprise of External Costs which are also called Externalities or Societal Costs such as adverse health effects for air emissions, damage to buildings or crops resulting from SO_2 and irreversible damage to the ecosystem. Environmental Externalities costs in Box C are those which the company is not accountable for. Table 2.1 of environmental costs identifiable and segregated as contained in the U.S.

Environmental Protection Agency (1995b) should be read alongside with the Figure 2.1 Cost Primer Model.

Figure 2.1 THE GEMI ENVIRONMENTAL COST PRIMER MODEL - COST BOUNDARIES



Source: Adapted U.S.EPA and Tellus Institute (1995c:21); Environmental Cost Accounting For Capital Budgeting: A Benchmark Survey of Management Accountants, June.

Environment Costs Budgeting, Accounting and Management

Concept of best practices in industrial production forms the fundamental basis for environmental accounting advocacy. The concept of Environmental Accounting (EA) requires a segregation of costs which are identifiable with environment pollution, degradation,

detection, prevention and remediation. In AT&T Green Accounting, it is defined as the identifying and measuring of the costs of environmental materials and activities and using this information for environmental management decisions. Pertinent of these costs are critical 'hidden', 'private' and 'externality' costs and the purpose is for environmental costs reduction, waste avoidance, increase in usage and recycling of wastes and environmental remediation.

Effective environmental costs identification, classification and reporting will give added objectivity to financial statements for decision making. Also, budgeting and effective budgetary control of environmental costs will allow for effective and efficient management of environmental costs control.

Environmental Costs

Environmental costs are subject to varied specifications and definitions. In the work of Shield, Beloff and Heller (1996), the term was often used to refer to costs incurred in order to comply with regulatory standards. Also, costs which have been incurred in order to reduce or eliminate releases of hazardous substances and all other costs associated with corporate practices aimed at reducing environmental impacts.

How a company defines an environmental cost depends on how the information is to be utilized, for example: cost allocation, capital budgeting, process or product design or other management decisions. Accordingly, it may not be clear what costs are environmental or not as some may fall into gray areas. That means that some costs may be classified as partly environmental and partly non-environmental (GEMI 1994; Fagg et al 1993). Identifying environmental costs has resulted in applicable terminologies such as Full Costs, Total Costs, True Costs, Life Cycle Costs and other descriptive costs, all in an attempt to emphasize the

inadequacy of conventional approaches because they have not accorded recognition to environmental costs.

Whereas, traditional costs classifications in accounting are:

1) Direct materials and labour, 2) Manufacturing or factory overheads, i.e. operating costs other than direct material and labour, 3) Sales overheads, 4) General and Administrative (G &A), and 5) Research and Development (R&D)

The U.S EPA (1989; 1995b:9; 1995c:21) and GEMI (1994) Environmental Cost Primer model (Figure 2.1) has segregated costs into direct costs, and distinguished costs which may be obscure through treatment as overheads, hidden, contingent, liability or less tangible costs. Examples of costs have been categorized into basic costs as in Table 2.1

Table 2.1: Environmental Costs in Firms

1.	**Potential Hidden Costs**		
	Regulatory	Upfront	Voluntary (Beyond compliance)
	Notification	Site studies	Community relations/ outreach
	Reporting	Site preparation	Monitoring/testing
	Monitoring/Testing	Permitting	Training
	Studies/Modeling	R & D	Audits
	Remediation	Engineering and procurement	Qualifying supplies
	Record keeping	Installation	reports e.g., annual environmental reports)
	Plans		
	Training		
	Inspections	2. **Conventional Costs**	Insurance
	Manifesting	Capital equipment	Planning
	Labeling	Materials	Feasibility studies
	Preparedness	Labour	Remediation
	Protective equipment	Supplies	Recycling
	Medical surveillance	Utilities	Environmental studies
	Environmental	Structures	R & D
	Insurance	Salvage values	Habitat and wetland protection
	Financial assurance		
	Pollution control	Back-End	Landscaping
	Spill response	Closure/ decommissioning	Other environmental projects
	Storm water	Disposal inventory	Financial support to environmental groups and/or researchers
	Management	Post-closure care	
	Waste management	Site surveys	
	Taxes/fees		

3.	**Contingent Costs**		
	Future compliance costs	Remediation	Legal expenses
	Penalties/fees	Property damage	Natural resource damages
	Resource to future releases	Personal injury damage	Economic loss Damages
4.	**Image and Relationship Costs**		
	Corporate image	Relationship with professional staff	Relationship with lenders
	Relationship with customers	Relationship with workers	Relationship with host communities
	Relationship with investors	Relationship with suppliers	Relationship with regulators
	Relationship with insurers		

Source: U.S EPA (1995b:9). An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms, Office of Pollution Prevention and Toxics, June.

Conventional Costs

Costs already recognized as conventional, such as costs of raw materials, supplies, capital goods and utilities are usually addressed in cost accounting but not necessarily as environmental costs. It is a truism that a decrease in the usage and less waste of raw material, supplies and non-renewable resources reduce environmental degradation and more environmental preference. These are important issues for internal decision making in management.

Potentially Hidden Costs

Table 2.1 which indicates a list of environmental costs, Hidden costs comprise upfront environmental costs which are incurred prior to the operation of a process, product or facility. Also, these include costs such as those relating to facility site, design of process, product or facility. Hidden costs may also constitute costs emanating from **regulatory requirement** such as remediation, monitoring and testing, inspections, and insurance among others. Environmental costs also consists **voluntary costs** such as those which go beyond compliance to statutory requirement, such as community relationship, insurance and feasibility

studies. **Back-end** environmental costs, quite unlike the upfront costs and others which may be obscured and unfairly allocated, may not be entered into records at all. These are future costs such as cost of decommissioning of process, closing a landfill to meet with regulatory requirement.

Contingent Costs

Contingent costs may not receive the attention of management because they constitute accidental environmental costs, which may or not be incurred in the future. These may include fines, costs for remedying or compensation for future releases of contaminants. Contingent costs are regarded as contingent liabilities.

Image and Relationship Costs

These costs are regarded as less tangible or intangible as they are incurred to affect the perception of management for relationship and the image of the corporate company. These include costs on relationship to community, customers, the internal workers and the regulators.

Further cost categories

IFAC (2005:37) International Guidance Document on Environmental Management Accounting prescribes environment related costs in line with both internationally accepted and emerging best practices.

Materials Costs of Product Outputs

These include the purchase costs of natural resources such as water and other materials that are converted into products, by-products and packaging. Examples are raw and auxiliary materials, packaging materials and water

Materials Costs of Non-Product Outputs

They include the purchase (and sometimes processing) costs of energy, water and other materials that become non-product output (waste and emissions); such as raw and auxiliary materials, packaging materials, operating materials, water, energy and processing costs

Waste and Emission Control Costs

These include costs for handling, treatment and disposal of waste and emissions, remediation and compensation costs related to environmental damage; and any control related regulatory compliance costs; such as equipment depreciation, operating materials, water and energy, internal personnel, external services, fees, taxes and permits, fines, insurance and remediation and compensation

Prevention and Other Environmental Management Costs

These include the costs of preventive environmental management activities such as cleaner production projects. These also include costs for other environmental management activities such as environmental planning and systems, environmental measurement, environmental communication and other relevant activities. Examples are equipment depreciation, operating materials, water, energy, internal personnel, external services and others

Research and Development Costs

These are costs for Research and Development projects related to environmental issues.

Less Tangible Costs

These are both internal and external costs related to less tangible issues. Examples include liability, future regulations, productivity, company image, stakeholder relations and externalities.

Gaps of Environmental Cost Primer Model

There are watertight definitions of costs classification, such as 'hidden costs', 'contingent costs' and 'image and relationship costs'. These definitions do not seem realistic as what is hidden costs to one cost identifier may not be so with another. There is also the tendency for double accounting for same costs which may be rightly classified as production and environmental costs. An existing gap is the non-reporting of the environmental costs along the identifiable costs segregations. Besides are the non-agreeable standards on environmental accounting at the moment.

2.4.3 THE COST BENEFIT MODEL

Cost Benefit Analysis (CBA) is a technique to identify all costs as compared to all benefits which result from particular courses of action. Many are of the opinion that Cost Benefit Analysis model is more broadly applicable to all environmental resources and environmental decisions. For instance in protecting endangered species, it will be required to provide estimates of all costs and the benefits to be derived in carrying out the actions of preserving the endangered species.

Cost Benefit Analysis in carrying out projects and programmes in the public sector is analogous to commercial or economic feasibility study in a profit organization. What is being explored is social feasibility rather than commercial feasibility in which values of all marketable and non-marketable inputs and outputs are estimated. Two ways of determining Costs-Benefits are:

1. Net benefits which are Total Benefits less Total Costs (Values discounted)

$$NBd = TBd - TCd \qquad (1)$$

OR

2. Cost Benefit Ratio = $\frac{TBd}{TCd}$ (2)

where NBd = Net Benefits discounted

TBd = Total Benefits discounted, and

TCd = Total Costs discounted

Cost Benefit Analysis for Environmental Accounting has been prominent with both the public and private sectors of the socio-economy. The environmental impacts are identified and measured and then translated into monetary terms. The major environmental losses are identified and fully estimated for as much as it is feasible. Subsequently, net present values relative to varied discount factors are estimated for purpose of decision making. Santhakumar and Chakraborty (2003:313); and Alberini, Rosato, and Turvani, (2006:xi) opine that Cost Benefit Analysis basis has been prominent for purpose of Environmental Accounting. The assertion of the methodology is buttressed by varied authorities in literature. It is also agreeable that in the developing countries, the discounting methods for evaluation have also been in use which is also prominent in Nigeria. According to Alberini, Rosato, and Turvani, (2006) factors for costing among others, and benefits estimated are:

1. Direct costs paid in monetary terms for environmental management such as compensatory afforestation, catchment area treatment, rehabilitation and environment safeguard and monitoring.
2. Losses due to submergence of forest land.
3. Minor Forest Products (MFP)

4. Reed, this is the estimated loss of reed.
5. Fishing, hunting and Tourism
6. Erosion control and water retention.
7. Carbon Sequestration.
8. Nutrient retention and micro-climate stabilization
9. Wild life habitat
10. Depository of bio-diversity
11. Losses due to dislocation of human settlements
12. Impact on the downstream of the river
13. Cost of protection against reservoir induced seismic activity (RIS)
14. Cost of controlling extensive deforestation
15. The direct and indirect benefits of the project

To estimate the value of benefits, it is necessary to find out how much people are willing to pay for those benefits. The challenge posed by valuation of non-marketable benefits requires valuation methods which circumvent regular market valuation methods. Alberini, Rosato and Turvani (2006:xii) agree that two acceptable methods of such valuation are the Travel Cost Method and the Contingent Valuation method. According to the authors, Travel Cost Method "uses actual visits to a resource, and the cost of traveling to and spending time at this resource, to estimate a demand function, from which it is possible to compute an individual's Willingness To Pay (WTP) for access to the resource and for improving its environmental quality". Also, "Contingent Valuation is an example of a survey-based, stated-preference method, which relies on what people say that they would do under well defined but hypothetical circumstances" they however emphasized that these methods do not provide

values on environmental resource per se, but value on marginal changes on environmental resource.

On the subject of pollution prevention, INFORM, a Non-Profit organization which carried out two study surveys in 29 chemical companies in 1985 and 1992, have revealed benefits of environmental accounting to the business communities. It was revealed at the Global Environmental Management Initiative (GEMI) Conference through questionnaire administered by Nagle (Nagle 1994:243) that corporate professionals are placing a high priority on environmental accounting. In 1995, companies in the United States of America through Business Round Table began to consider implementing environmental accounting in their facilities.

Field (2001:134) postulates a basic framework of benefit – cost analysis as including the following steps:

- Deciding the overall perspective from which analysis is being done such as the identifiable target public in a public project.
- Specifying the project or programme, whether the physical project or the environmental regulatory framework
- Quantitatively describing the inputs and the output as much as possible in monetary value terms. Since many projects will extend over a period of time, the challenge faced is the prediction of values for the future inputs and outputs because a lot of uncertainties may arise.
- Estimate the social values of all inputs and outputs. Here, the challenge is the difficulty of monetizing certain socio costs or benefits or estimate values which may be placed on them through willingness to pay.

We finally compare the benefits and the costs either through the Net Benefit, i.e. Total benefits less Total Costs, or Benefit – Cost – Ratio which is Total Benefits divided by Total Costs.

Gap of Cost Benefit Model

Although CBA is most widely used as a model for costs evaluation, it is controversial because of the usually substantial long-term period and uncertainty in a constant discount rate. This is not only considered as unrealistic for the future cash flow but also, the implication on the evaluation outcome and eventual implication on environmental decisions.

In Newell and Pizer (2003:52-71 and 2004:519-552), an averaging of three discounting models has been advocated for purpose of the CBA. The three new models are: Constant exponential model, Newell-Pizer discount model, and State Space model. In the empirical data research, the rates of the constant exponential discounting rate is highest of the three, the Newell-Pizer model declines most steeply over time, the State Space is intermediate. Details of these work is however, not the focus of this study.

2.4.4 ECO-EFFICIENCY FRAMEWORK

An ecosystem is largely determined by the natural environment as opposed to the activities of man. There is a dynamic interrelationship between the natural environment and man. ERA (1998:109) in its contribution to the issue of environmental sustainability (see effects on environment on Tables 2.2 – 2.4), emphasize man's critical responsibility to face the challenge of depletion of the environment. ERA has therefore, suggested the need to address three critical questions:

- How can man minimize use of the natural resources and maximize natural resource supply?
- How can the supply of natural resources be sustained without damage to the environment?
- Where damage has occurred to the natural environment particularly the non-replenishing environment, how can this be repaired?

Table 2.2: Decline in Size of Marine Fishing in the Nigeria Niger Delta

Length in cms	1981	1991
Croaker	32.32	26.41
Soles	32.88	25.47
Threadfin	24.08	20.81

Source: ERA (1998:109): The Human Ecosystems of the Niger Delta – An ERA Handbook, Benin City, Nigeria; Publishers: Environmental Rights Action.

Table 2.3: Decline in Size in Tonnage/Trawler of Marine Fishing in the Nigeria Niger Delta

Tonnes/Trawler	1980	1985	1989
Croaker	739	403	521
Soles	82	89	19
Catfish	318	3	0
Snappers	105	27	16
Barracuda	159	21	7

Source: ERA (1998:109): The Human Ecosystems of the Niger Delta – An ERA Handbook, Benin City, Nigeria; Publishers: Environmental Rights Action.

Table 2.4: Mangrove conversion in Nigeria Niger Delta (Rivers and Bayelsa States) by Shell Petroleum Development Company alone

ACTIVITY	IMPACT
Seismic Lines	56,000 km
Drilling	349 sites

Flow lines	700 km
Pipelines	400km
Flow stations	22 sites
Terminal	1 site

Source: ERA (1998:109): The Human Ecosystems of the Niger Delta – An ERA Handbook, Benin City, Nigeria; Publishers: Environmental Rights Action, and the World Bank Report of 1995.

The background of this study is therefore, that of securing and to facilitate eco-efficiency. Eco-efficiency suggests that organizations can produce more useful products while simultaneously reducing negative environmental impacts, resource consumption and costs. Eco-efficiency further suggests that rather than focus on the consequences of negative environmental impact, attention should be on attacking the causes. In the opinion of Hansen and Mowen (2000:666), this concept suggests at least three important messages, firstly, improving ecological and economic performance which should be seen as complementary. Secondly, that improving environmental performance should not be viewed as charity and goodwill but a matter of competitive necessity. This is in contrast to Rubenstein's (1990:2) view where he had opined that social costs (i.e. environmental costs) which are not matched with related revenue are incurred not for the good of the individual company but for the society. A third suggestion is that eco-efficiency should be seen as supportive of sustainable development.

In the views of Gray and Bebbington (2006:8) and Walley and Whitehead (1994:46-52), eco-efficiency which has been emphasized as Environmental Management System (EMS) is the application of accounting design to attain financial and economic savings in resource usage. It is also, the reduction of wastes, energy and emissions that will necessarily lead to reductions in corporate adverse impact on the environment.

Hansen and Mowen (2000:667) have further proffered definition for sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ They opined that although, absolute sustainability may not be attained, progress toward its achievement has some merit. Eco-efficiency, an implication of improving environmental performance will secure several advantages such as increasing customers demand for cleaner products, those produced without degrading the environment. Also, employees prefer to work for environmentally friendly organizations. Other benefits are that environmentally responsible firms tend to capture external benefits such as lower cost of capital and lower insurance rates; efficient environmental performance in an organization will secure good health to humanity; the consciousness to pursue environmental cleanliness will serve as a drive for improved technology; and a policy of clean environment and the implementation of the policy are capable of reducing environmental costs and making for a competitive advantage.

2.4.5 ENVIRONMENTAL QUALITY COST MODEL

This is also known as Environmental Cost Reduction Model. It suggests that the lowest environmental costs will be attained at the point of Zero-Damage to the environment. It is considered that before environmental cost information can be provided, environmental costs must be defined. Environmental quality model is the ideal state of zero-damage to the environment, which is analogous to Environmental Quality Management (EQM), a zero-defect state of total quality management. This is certainly compatible with the concept of eco-efficiency

Environmental costs incurred are costs arising because poor environmental quality exists or may exist and these have to be prevented, reduced or remedied. Hansen and Mowen (2000:668) have defined environmental costs 'as costs associated with the creation, detection, remediation and prevention of environmental degradation'. They therefore, classify environmental costs into four categories of: 1) Prevention Costs, 2.) Detection Costs, 3) Internal Failure Costs and 4) External Failure Costs.

Environmental Pollution Prevention Costs

These are costs of activities which are meant to prevent the production of contaminants and wastes which could cause damage to the environment. The costs include costs incurred in evaluating and selecting pollution control equipment, quality environment consumables, designing processes, designing products and carrying out environment studies. Others are auditing environmental risks, developing environmental management systems, recycling products and obtaining ISO 14001 certification.

Environmental Detection Costs

Environmental detection costs are costs resulting from activities to determine if products, processes and other activities within the company are in compliance with appropriate environmental standards. The costs include auditing environmental activities, inspecting products and processes, developing environmental performance measures, testing contamination and measuring contamination level.

Environmental Internal Failure Costs

These are costs resulting from the activities performed because contaminants and wastes have been produced but have not been discharged into the environment. Internal costs are incurred to eliminate and manage the wastes produced. The costs are costs for operating pollution control equipment, costs incurred for treating and disposing of toxic wastes, maintaining pollution equipment, licensing facilities for producing contaminants and costs resulting from recycling scrap.

Environmental External Failure Costs

These are costs of activities performed after discharging contaminants and wastes into the environment. These costs are those for cleaning up a polluted lake, cleaning up oil spills, cleaning up contaminated soil, settling personal injury claims which are environment related, restoring land to natural state, among others.

The need for Environmental Accounting is to enhance and further drive for the benefit of eco-efficiency which maintains that organizations whose activities adversely affect the environment can carry out their activities of production while simultaneously reducing negative environmental impacts, resource consumption and costs.

Gap of Environmental Quality Cost Model (EQCM)

Zero-damage point to the environment may not be attainable at anytime and may therefore, be an illusion. Productivity in an environment may however, tend towards eco-efficiency. Certain costs may correctly fall on either one or two environmental costs classifications. Again, costs classification may not be held as watertight concept.

2.5 ENVIRONMENTAL AUDIT

Auditors and accountants are increasingly drawn to environmental issues and activities which affect corporate performance. To report on environment, they have to provide financial information and assurance reports which are credible. This is what decision makers in managements have to place reliance upon. Environmental auditing (INTOSAI: 2004) is expected to 'encourage greater transparency and informed decisions about the application of resources and the impact of activities on environmental outcomes without distorting existing accounting standards'.

Environmental Audit is assessing environmental impacts of corporations' operations. It is the measurement and evaluation of all inputs and outputs from the production process. In order to implement cleaner production and eco-efficiency improvements, environmental audit can be an effective risk management tool for assessing compliance with environmental legislation. This subsequently assists companies to avoid the risk of prosecution and fines arising from potential environmental breaches. According to Australian Government Department of Environment, Water Heritage and Arts, (INTOSAI: 2004) a good audit will include a number of components, some of which are listed below:

- **Data Collection**: to identify and measure all inputs and outputs from the production process and provide a baseline for comparison against targets and a background for improvement.
- **Compliance**: to review and compare a company's activities and business targets against all relevant regulations, codes of conduct and government policies to assess compliance.

- **Documentation**: to document all aspects of audit to assess progress at a further date and to verify environmental performance to staff, regulators and the general community.
- **Periodic Audits**: to assess the impacts of new or changed legislation on operations and to assess whether internal targets for environmental efficiency are being met."

2.6. ENVIRONMENTAL ACCOUNTING AND REPORTING

2.6.1 EQCM AND FINANCIAL REPORTING

The Environmental Quality Cost Model prescribes ideal cost measurements which are found relevant in modern cost and management accounting. Activity Based Costing/ Management (ABC/M) and Management as approaches of cost driver certainly facilitate Environmental Quality Cost Model concept. Whereas, effective cost and management accounting in the ABC/M concept is at best reported for internal management consumption, it is not reported in annual reports and financial statements as disclosure to the public (Asaolu & Nassar: 1997:4, 2002; Okafor and Akinmayowa: 2004:106-117).

Environmental Quality Cost Model however gives us an indication and possible direction in the thought trend of environmental cost and management accounting. EQCM ideals are expected to enhance environmental accounting which is an improved state over current conventional cost accounting.

We however, consider the alternative which is based on the current financial reporting and disclosure requirement. This is what is currently feasible from our statutory annual financial statements. This will be a furtherance of the Legitimacy Theory and Risk Society Theory for companies' Voluntary SER disclosures of information and to the extent a perceived legitimacy gap can be closed. Campbell, Craven and Shrives (2003:564), selected three groups

of companies. These companies depend on their supposed depth of more justification for the 'sinfulness' negative impact on the society (these were effect of tobacco and drinking on the society). This sample was restricted to those companies that had been continual members of the U.K. FTSE 100. In this regard, references are made to the works of Lindblom (1994); Gray et al (1995a:47-77); Trotman and Bradley (1981); Guthrie and Parker (1990:159-176); Patten (1991); Hacksten and Milne (1996:77-108) and Adams, Hill and Roberts (1998).

This study focuses on a wider scope by considering the Oil and Gas Sector and Manufacturing companies (particularly those listed in the Nigerian Stock Exchange) and Security Exchange Commission which are acclaimed to have far reaching degradation effect on the environment. We have however also considered other manufacturing companies through secondary data and information (i.e. annual reports and/or environmental reports). We have therefore considered factors or variables such as those expressed in the functional form. The rating variables and modification in this research are agreeable to Aerts, Cormier and Magnan (2006:327) categorization of environmental costs as set below:

Economic Factors:

- Expenditures for pollution control equipment and facilities
- Operating costs of pollution control equipment and facilities
- Future estimates of expenditures for pollution control equipment and facilities
- Future estimates of operating costs for pollution control equipment and facilities
- Financing of pollution control equipment or facilities
- Environmental debts
- Risk provision
- Provision for charges

Laws and Regulation

- Litigation (present and potential)
- Fines
- Orders to conform
- Corrective actions
- Incidents
- Future legislation or regulation requirements

Pollution Abatement

- Air emission information
- Water discharge information
- Solid waste disposal information
- Control installations, facilities or processes described
- Compliance status of facilities
- Noise and odours

Sustainable Development Reporting

- Conservation of natural resources
- Recycling
- Life cycle information

Land Remediation and Contamination

- Sites
- Efforts of remediation (present and future)
- Cost/potential liability (provision for site remediation)
- Spills (number, nature, efforts to reduce)

- Liabilities (actual and potential)

Environmental Management

- Environmental policies or company concern for the environment
- Environmental management system
- Environmental auditing
- Goals and targets
- Awards
- Department or office for pollution control
- ISO 14000
- Participation in elaboration of environmental standards
- Joint projects with other firms on environmental management

This means that relationships are expected between the dependent variables and the respective independent variables. The variables stated above are feasible for measurement from secondary data source which are the Corporate Annual Reports and /or Environmental Reports. Besides, EQCM also lends support to this option since it states that a tendency towards eco-efficiency through increasing reporting of environmental issues will have positive impact on corporate turnover, profitability and consequently, corporate net worth.

2.6.2 COST ESTIMATION FOR ENVIRONMENTAL ACCOUNTING

IFAC (2005) International Guidance Document on Environmental Management Accounting is an appreciable work on Environmental Accounting. Although, it is not yet a regulatory standard, it is intended to be a guide document which may translate into a future regulatory standard. This will be the case as accounting for the environment and related issues are taking on increasing global importance. Emerging benefits of Environmental accounting

are valuable internal management initiatives with specific environmental focus towards cleaner production, supply chain management as well as environmentally preferable purchasing and Environmental Management System. EMA information is increasingly being used for external reporting purpose globally.

2.6.3 EXTERNALITY ENVIRONMENTAL COSTS AND PROPERTY RIGHTS

The manner in which producers and consumers use environmental resources truly depend on the property rights governing those resources. Tietenberg (2006:63) explains property rights as ‘a bundle of entitlements defining the owner’s rights, privileges and limitations for use of the resources’. Therefore, who is held for externality environmental costs has become an issue of controversy. If property rights are assigned to individuals (the sufferers) as in typically capitalist economy, to carry out their activities, polluter corporate organizations will be prepared either to pay the sufferers or aggressively engage Research and Development for more efficient technology to reduce to the barest their pollution activities. This will be the case since sufferers will prefer less or zero damage to their resources. On the other hand, if the property rights are assigned to corporate organization polluters, then those who suffer may be prepared to pay the polluter to reduce its scale of activity and the level of pollution. The process of bargaining ensues either way.

Arguments for and against are held on the commonly held view of Polluter Pays Principle (PPP) The Polluter Pays Principle has largely affected earlier Environmental Policies which had defined environmental principles and action such as prevention better than cure, environmental impacts to be taken into account in early decisions**,** co-ordination of national resources, environmental impact assessment**,** protection of nature and biodiversity**,** making

most use of environmental resources**,** reducing pollution source**,** setting sustainable development targets and target climate change, acid rain and air pollution, urban quality of life and coastal resources.

In the view of Ison, Peake and Wall (2002:80) reasons for the equity argument are that if polluters are aware that they will have to pay compensation in full to sufferers of pollution, this will encourage research into more environmentally friendly technology. On the other hand, if sufferers are to pay, sufferers often find it more difficult to organize themselves; also that sufferers may not have sufficient funds to compensate polluters for the cost reducing pollution.

2,6.4 Internalizing externality costs

Howes (2002:15) explains explicitly the critical need to internalize environmental externalities as follows:

> While companies 'add value' through their activities they also extract value for which they do not pay. Their activities and operations give rise to external environmental impacts such as the contamination of groundwater, traffic congestion, poor urban air quality and so on. The costs of these external impacts are picked up by the rest of society, prices do not reflect costs and as such companies (and individuals) do not pay the full costs of their production and consumption decisions. Instead sub-optimal and inefficient decisions are made as producers and consumers respond to imperfect price signals…The degree to which the company is genuinely 'adding value' through its activities remains uncertain and if the company was to pay dividend, the payment could end up

being made out of natural capital rather than income- a situation which is clearly unsustainable over the long term.

Howes (2002) greatly explains sustainability costs as quoted below:

> The sustainability cost estimate for a company's activities, as shown in the pro-formal accounts, is simply the summation of all of the various quantified and valued environmental impacts. It represents the calculated cost to the company to reduce its environmental impacts to a socially acceptable and sustainable level. The principal purpose of the estimation is to illustrate what a given/stated improvement in environmental quality would cost. Market prices are used whenever possible. To facilitate the ability to compare sustainability costs estimations (and or environmentally-sustainable profit figures) between years and between different companies, institutional incentives (in the form of grants and rebates) together with potential savings available if avoidance options are adopted should be excluded from the accounts. Although of immense importance in terms of decision making, such incentives may change overnight and hence comparative figures from prior years could become meaningless in later periods. Consequently, the estimations simply represent the cost of achieving a given improvement in environmental quality based on current (and available) technology. In this 'pure' form, the sustainability cost estimate (to achieve consistent standards or improvement in environmental quality) will only change for two reasons: changes in absolute emissions/impacts (which will hopefully be decreasing) or from changes in abatement technology (and the price of the technology.

When deducted from the company's financial profits as reported in the main annual report and accounts, an estimate of what could be considered as the company's environmentally-sustainable profits is obtained. It is this linking of the monetarised environmental performance data to the mainstream financial accounting (and or management accounting) system that is the key innovation in the methodology. Senior managers and directors are familiar with traditional accounting and reporting systems, and by integrating monetarised impact data in this way, the methodology provides: an easily understood take on what the external costs and negative impacts of the company's operations are; and more importantly, an indication of what it would cost the company to get its operations onto a more sustainable trajectory and a base line upon which to measure progress year on year. Howes (2002:27-28)

2.6.5 ACCOUNTING STANDARDS

AICPA Environmental Issues Roundtable

Flemming (1993) reported the AICPA Environmental Issues Roundable, a technical meeting which b*e*lieves that it was the appropriate time to evaluate the problems of applying accounting and auditing standards to environmental matters. Objectives of the AICPA Roundtable according to Flemming were to:

* Examine problems CPAs have in practice applying generally accepted accounting principles to environment-related financial statement assertions.

* Identify environmental issues for which authoritative accounting and auditing guidance may be needed.

* Provide a starting point for developing guidance, including continuing professional education conferences and courses, on applying accounting and auditing standards to environmental matters.

Presentations at Roundtable

Arising from the roundtable conference, to help professionals assess the need for new or revised accounting and auditing guidance, participants had presentations on

* The legal aspects of environmental liability.

* Perspectives on environmental accounting issues from the FASB, the SEC and industry.

* Auditing environmental liabilities.

Canadian Perspective

According to Flemming (1993), Canada was also exploring environmental accounting by considering the following: What are environmental expenses? What triggers an environmental liability? Should expenditures be capitalized or expensed?

Today, Canada is one of the foremost nations active in environmental resource accounting and management and policies on the environment (Statistics Canada:2006)

International Accounting Standards on Environmental Issues

The International Accounting Standards Committee (IASC) and the UK's Accounting Standards Board (ASB) have standards issued (although not specifically) to incorporate environmental issues. Specifically, the content of these standards are as follows:

- IAS 36 deals on Impairment of Assets,
- IAS 37 and FRS 12 on Provisions, Contingent Liabilities and Contingent assets,
- IAS 38 on intangible assets.

The IASB and ASB standards have been effective since 1st July 1999 and 23rd March 1999 respectively. Among other provisions, Appendix C of IAS 37 and FRS 12 specify issues such as:

- contaminated land – legislation then to be enacted
- contaminated land – constructive obligation
- offshore oilfields – decommissioning costs
- a legal requirement to fit smoke filters
- a court case – deaths from food poisoning
- repair and maintenance.

IAS 37 on Provisions, Contingent Liabilities and Contingent Assets is an attempt in the direction of environmental reporting. IAS 38 provides for recognition of the emission allowances rights as Intangible Assets. Also, IAS 20 touches on fair market value of rights and issue price of government and difference recognized where issue price is lower than fair market value. The difference is to be treated as Government grant. Issues are still in dispute even as America has not accented to the Kyoto document at the time of this study.

The issues on environment arising from the Kyoto Convention have further implications for need for compliance to regulations for pollution prevention and environmental protection. Besides, it touches on Carbon Allowances for nations and accounting valuation for Carbon Trading among trading nations.

Decision making in corporate organizations and the public sector for industrialization requires effective and efficient environmental cost accounting and benefit-cost analysis for impact of environmental activities. Some works have been done in this area in some developed countries especially in Canada (the Ontario Hydro case) and the US.EPA AT&T Study, and in recent years, UK, France, Sweden and Denmark. This study is therefore, aimed at the Nigeria oil & gas and manufacturing sectors because of the effect of its operations and impact on the ecology.

Findings from UNEP/ Sustainabity Ltd (1996) reveal that although not many nations are currently reporting disclosures on environmental issues in financial statements, but quite a growing number do so to internal management. Pressure is mounting for mandatory rather than voluntary reporting worldwide. Skillius and Wennberg (1998:24) have noted that many European countries (e.g. UK and France) have various national Pollution Release and Transfer Registers (PRTRs) following the PRTRs published by the OECD. PRTR calls for firms to report on their releases and transfers of varieties of substances and on compliance to environmental regulations. Skillius and Wennberg reveals that whereas, Sweden requires for its authorities environmental information and reports, Denmark requires its Green Accounts in line with its Environmental Protection Act 35. The Norwegian Companies Act and the Law of Accounts require that the companies must report whether it pollutes the environment and if so, what actions and plans are taken to prevent the occurrence. In the U.S, the Toxic Release

Inventory (TRI) as a result of the Emergency Planning & Community Right–To–Know Act (EPCRA) requires all companies with more than 10 full time employees to submit data on use of a list of different toxic chemicals to the Environmental Protection Agency (Skillius and Wennberg, 1998)

Concerns and initiatives continue to increase to regulate the environment and Global Climatic Change. Environmental laws and regulations continue to evolve in the US, the U.K, Canada and most parts of the world. Environmental laws and regulations including those that may arise to address concerns about Global Climate Change are expected to continue to have increasing impact on corporate organizations. For example in the US, the Energy Policy Act of 2005 which imposed obligations to provide increasing volumes on a percentage basis of renewable fuels in transportation motor fuels through 2012, was changed with the enactment of the Energy Independence & Security Act of 2007. (Skillius and Wennberg, 1998)

On Climatic Change, there have been proposed or promulgated laws (nations and international) focusing on greenhouse gas (GHG) reduction. Compliance with promulgations or changes in laws, regulations and obligations on GHG emissions trading scheme or GHG reduction policies generally will significantly increase costs for corporate bodies. Examples (excerpt of ConocoPhillips: 2008 Annual Reports) are:

- European Emissions Trading Scheme (ETS), the program through which many of the European Union (EU) member states are implementing the Kyoto Protocol.
- California Global Warming Solutions Act, which requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California's greenhouse gas emissions by 25% by 2020.

- Two regulations issued by the Alberta government in 2007 under the Climate Change Emissions Act. These regulations require any existing facility with emissions equal to or greater than 100,000 metric tons of carbon dioxide or equivalent per year to reduce the net emissions intensity of that facility by 2% per year beginning July 1, 2007, with an ultimate reduction target of 125 of baseline emissions.
- The US Supreme Court decision in Massachusetts v. EPA, 549 US 497, 127 S.Ct. 1438 (2007) confirming that the US Environmental Protection Agency (EPA) has the authority to regulate carbon dioxide as an air pollutant under the Federal Clean Air Act.

2.6.6 TREATMENT OF ENVIRONMENTAL CAPITAL EXPENDITURE

The debate as to whether to capitalize Environmental Capital Expenditure (ECE) or to expense it rages on. Whereas FASB (1989, 1990) requires that ECE be capitalized considering that they are long-lived pollution abatement expenditure, certain critics however query the rationale considering on their part that since such expenditures do not result in incremental future economic benefits, ECE should be expensed in current year (CICA 2003). According to Clarkson and Richardson (2004:330), there is a consesus that site remediation costs should be expensed since there are no incremental future economic benefits.

The challenge facing possible international standards, the IASB is that there are not yet agreeable standards on environment costs and particularly, valuation of natural resources inventory for the balance sheet or valuation for depletion or degradation. For example, the International Financial Reporting Interpretations Committee (IFRIC) of the International Accounting Standards Board (IASB:2004) on the emerging Markets for Emission Rights in the

European Union released two interpretations – IFRIC 3 Emission Rights and IFRIC 4 which determine whether an Arrangement contains a Lease. No sooner than these releases were made than they were subsequently withdrawn in June 2005. Adduced reasons were:

1. Markets for Emission Rights although developing, but were still thin, and
2. That there was need to comprehensively provide for the development at the appropriate time.

There are attempts to harmonize reporting on environmental issues. Global Reporting Initiative (GRI) however provides the following core environmental indicators - materials, energy, water, biodiversity, emissions, effluents and waste, suppliers, products and services, compliance and transport.

2.6.7 ENVIRONMENTAL ACCOUNTING FOR MARKET DRIVEN COMPETITIVENESS

Corporate bodies are market driven as a result of the stiff competitive market environment in business. For instance, the European Bank for Reconstruction and Development (1995) in Skillius and Wennberg (1998:12) express three ways in which companies' environmentally related risks and opportunities can be evaluated for credit purpose;

1. **Enhanced credit risk**. This may be due to punitive fines for environmental violations, or remedial works, delays and increased costs. These may be because of public opposition or loss of business because of inability to comply with environmental standards which are required by customer demands or response to new customer demands. These costs may reduce or eliminate the company's ability to pay back a loan.

2. **Security impairment risk**. This may be due to contamination of land; inventory or equipment rendered obsolete by the introduction of new environmental laws and standards. This may reduce or eliminate the value of the loan security.
3. **Direct liability risk**. This may be where legislation or common law makes financial institutions directly liable for environmental damage associated with the customers.

UNEP (1995) study of international banks stated that bankers believe a need exists for more meaningful and analytical data and risk quantification tools. The study revealed that over 80% perform some degree of environmental risk assessment before giving credit to a client. Apparently, environmental risk management is part of the basic credit process in virtually all industrial countries and most transitional economies. For this purpose, extensive checklists and questionnaires have been developed. UNEP also reports that bankers are beginning to look beyond the physical issues directing greater attention toward management quality and environmental management systems.

2.6.8 ENVIRONMENTAL DISCLOSURE

Corporate organizations are engaging more actively in environmental disclosure in their annual financial statements. This is peculiar with more financially successful companies in both the U.S.A and the U.K. In the United States of America, SEC regulations and accounting standards require American companies to disclose environmental information in annual reports. An International Public Accounting firm KPMG (1999), (Gernon and Meek 2001:98), and Aert, Cormier and Magnam (2006:303) report from the KPMG's survey in 1996 that 'since 1993 the percentage of 100 companies in 12 leading industrial nations that mention the environment in annual reports have almost doubled to 69%'. Also, that 23% now produce a

separate environmental report compared to 13% in 1993'. The same source reveals that Roche, a Swiss conglomerate is reputable for environmental disclosure on:

- Safety and Environmental protection expenditure
- Accidents and incidents
- Audit programme
- Developments in environmental policy
- Sustainable development, and
- Environmental remediation

The Danish company Novo Nordisk, according to the survey, is also reputable, having in 1998 won awards for three consecutive times the European Environmental Reporting Awards. Most disclosures at the moment worldwide including Nigeria are still voluntary and the few companies are deliberating on policies to calculate costs. Sources of disclosure of information to company investors at the moment are through Voluntary disclosure, External non-firm sources of disclosure and Mandatory disclosure

Disclosure entails the release of a set of information relating to a company's past, current and future environment management activities, performance and financial implications. It also comprises information about the implications resulting from corporate environmental management decisions and actions. These may include issues such as expenditures or operating costs for pollution control equipment and facilities; future estimates of expenditures or operating costs for pollution control equipment and facilities. These may also include sites restoration costs, financing for pollution control equipment or facilities, present or potential litigation, air, water or solid waste releases; description of pollution

control processes or facilities; compliance status of facilities; among others. Discussions of environmental regulations and requirements; environmental or conservation policies, environmental awards or prizes; existence of environmental management or audit departments, are contained in the long list (Aerts, Cormier and Magnan, 2006:327). Soonawalla (2006:398) observes that the main environmental issues in financial reporting are summarized as:

- Environmental costs, whether to expense or capitalize.
- Classification of environmental costs
- Disclosure on details and / or breakdowns about environmental costs
- Treatment of environment-related financial impacts on assets
- Treatment of liabilities and contingent liabilities and how to recognize these
- Measurement of liabilities and contingent liabilities
- Environmental reserves, provisions and charges to income
- Impact of accounting rules (GAAP) on corporate behaviour
- Environment information to be disclose in greater details.

2.6.9 INSTITUTIONAL AND POLICY FRAMEWORK

In recognition of the importance of addressing the problem of environmental degradation, the government of Nigeria established the Federal Environmental Protection Agency (FEPA) in 1988, now Federal Ministry of Environment. The duties include devising policies for the protection of the environment such as biodiversity and conservation, management and

monitoring of environmental standards. The Federal Ministry of Environment (FMEnv) is also saddled with the responsibility for the sustainable development of Nigeria's natural resources and the development of operation of procedures for conducting environmental impact assessments of all development projects. To ensure that the FMEnv is empowered to manage environmental issues, the Environmental Impact Assessment (EIA) Act was passed in 1992 under FEPA. The EIA Act, 1992 empowers the regulatory institution to ensure the implementation of mitigation measures and follow-up programmes such as the elimination, reduction or control of the adverse environmental effects of any project. Also, responsible for the restitution of any damage caused by such effects, through replacement, restoration, compensation or any other means (FEPA, 1992)

According to the same source, the following are some of the identified export-induced increases in production that have increased environmental problems in Nigeria:

- Deforestation and desertification resulting from the exploitation of unprocessed log wood for export;
- Depletion of wild fauna and flora due to exportation of certain endangered species;
- Depletion of fish stock resulting from over-fishing in the territorial waters for exportation;
- Oil and Gas exploration which has resulted in serious environmental degradation especially in the Niger Delta area of Nigeria; and

- Increased activities in the Tannery industries leading to discharge of increased volume of effluents which have exacerbated the incidence of pollution of rivers and streams including underground water in certain industrialized areas of Nigeria.

We seek to ascertain how effectively companies in Nigeria have carried out the required standards stated in these provisions.

2.6.10 REGULATIONS, STANDARDS AND CODES ON ENVIRONMENT IN NIGERIA

In Nigeria, there are various statutes, regulations, standards and recommended practices of the Federal Ministry of Environment. Nigeria has regulations prohibiting and controlling of pollution of water, air and land before the enactment of the Environmental Impact Assessment Act of 1992. These include the following:

- The Oil in Navigable Water Act of 1968
- The Petroleum Act of 1969, Section 8
- The Petroleum (Drilling and Production) Regulation of 1969
- The Mineral Oils (Safety) Regulation
- The National Environmental Protection Regulation (NEPR) 1991

Important regulations subsisting on Environmental Impact Assessment (EIA) in Nigeria are:

- The Environmental Impact Assessment Act (EIA), 1992 and
- The Department of Petroleum Resources (DPR) Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN), 2002

The Environmental Impact Assessment Act (1992)

Exxon Mobil (2004) in EIA of EAP-AOR Project the EIA Act of 1992, No. 86, makes EIA mandatory for all new major public and private projects in Nigeria and sets out the following guidelines:

- consider the likely impacts, and the extent of these impacts on the environment before embarking on project and activities;
- promote the implementation of appropriate policy in all Federal Lands and Territorial Waters consistent with all laws and decision making processes through which the goal of the Act is realized; and
- encourage the development of procedures for information exchange notification and consultation between organizations and persons when the proposed activities are likely to have significant environmental effects on boundaries or trans-state of the environment of bordering towns and villages.

The Act gives specific powers to the Federal Ministry of Environment (FMEnv) to facilitate the execution of EIA Studies of all projects.

The DPR Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN), 2002

The Department of Petroleum Resources Act 1979 which set up the Department empowers it to supervise the operations of the Nigeria Oil and Gas industry and to ensure that the petroleum industry does not degrade the environment in their operation. The DPR EGASPIN 2002 is guidelines for control of:

- discharge of produced fluids, drilling mud, drill cuttings, etc;
- air emissions and flaring;
- noise;
- management of wastes; and

- decommission of facilities.

This is regulatory guidelines which has attained high standards in the oil and gas sector in Nigeria. It is comparable to world international standards.

2.6.11 POLICY ASSESSMENT

General opinion is that Nigeria has policies on environmental management, which are impressive. The objective or implementation of the policies have, however not been realized because the laws have been weakly implemented so far. Be that as it may, neither the Institute of Chartered Accountants of Nigeria (ICAN) nor the Nigerian Accounting Standards Board (NASB) has focused any serious attention on Environmental Issues and Financial Reporting. NASB however looks forward to regulations provided in the International Accounting Standards Reporting requirement which Nigeria will adopt in its Financial Reporting in the years to come.

2.6.12 MANDATORY DISCLOSURE FOR CORPORATE ORGANIZATIONS IN NIGERIA.

In Nigeria, no Statements of Accounting Standards (SAS) require specific disclosures or the provision of detailed environmental information. SAS 23 on Provisions, Contingent Liabilities and Contingent Assets also having the requirements of the IAS 37 is the closest to environmental disclosure. SAS 23 states that:

> "Contingent liabilities be provided for in the accounts. If it is probable that a transfer of economic benefit will be required to settle that obligation and the amount of obligation

can be measured with sufficient reliability, a disclosure shall be made in the financial statement".

The researcher is of the opinion that SAS 23 jointly with SAS 2 on Information to be Disclosed in Financial Statements are indicative requirements for provision for specific disclosure of definite environmental liabilities and contingent environmental liabilities in the notes to annual reports. SAS 23 became effective in Nigeria only in 2006. Since SAS 2 refers to contingent liabilities under general provisions for liabilities; there should be deliberate reporting on environmental issues as current global trend demands which will therefore, require standards for environmental issues disclosure. The accountancy standards setters in Nigeria should specifically see to this, more so, that the Federal Ministry of Environment's statutory requirements on environment do not cover costing and disclosure requirements for companies. The accounting standards compel organizations to disclose possible debts in financial statements when there is significant environmental expenditure and when that cost can be reasonably estimated. Orisajinmi (2005:11)

2.6.13 ENVIRONMENTAL STANDARDS IN NIGERIA

Environmental Legislation and Regulations in Nigeria Agenda 21 of the 1992 Earth Summit, the unprecedented attendance of heads of governments (ERA 1998:37), is the global plan of action to focus world attention on environmental issues to which Nigeria is a signatory. The Nigeria National Agenda 21, states some of the relevant legislations that have either been reviewed or are under review. These were in response to the possible negative impacts of trade on environment, which include:

- Gas Re-Injection Act

- Endangered Species (Control of International Trade and Traffic) Act.
- Minerals Act
- Forestry Laws
- Harmful Wastes (Special Criminal Provisions, etc) Act

2.7 ENVIRONMENTAL QUALITY REPORTING MODEL (EQR) AND RESEARCH OPERATIONALIZATION

Identifiable variables which are meant to address environmental cost accounting in this study are considered in the perspectives set out. We considered the theory of Hansen and Mowen's (2000:667) on Environmental Quality Cost. Model components or variables in this study are Environmental Pollution Prevention Costs, Environmental Detection Costs, Environmental Internal Failure Costs and Environmental External Failure Costs. Environmental Quality Reporting (EQR) may be expressed from company's responsiveness to the mentioned variables. Environmental measurement and rating of variables and modifications in this research are agreeable to Aerts, Cormier and Magnan (2006:327). The modifications on Aerts, Cormier and Magnan's variables are necessitated because their literature focused on social responsibility rather than cost accounting responsiveness for the environment, although Hansen and Mowen (2000) made attempts to capture environmental cost accounting. Therefore:

EQR = f(Environmental Operating Expenditure/Costs Responsiveness (EOPEX), Environmental Capital Expenditure/Costs Responsiveness (ECAPEX), Environmental Technology Content for production Responsiveness (COTEC), Environmental Pollution Detection Expenditure/Costs Responsiveness (PODET), Environmental Pollution Prevention

Expenditure/Costs Responsiveness (POPREV), and Environmental Externality Expenditure/Costs Responsiveness (EEXTC).

EQR (Y) = f(EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC)

Where, $Y = a_0 + a_1EOPEX + a_2ECAPEX + a_3COTEC + a_4PODET +$

$a_5POPREV + a_6EEXTC + \varepsilon$

a_0 = Constant/Intercept

EOPEX = Environmental Operating Expenditure/Costs Responsiveness

ECAPEX = Environmental Capital Expenditure/Costs Responsiveness

COTEC = Environmental Technology Content for production Responsiveness

PODET = Environmental Pollution Detection Expenditure/Costs Responsiveness

POPREV = Environmental Pollution Prevention Expenditure/Costs Responsiveness

EEXTC = Environmental Externality Expenditure/Costs Responsiveness

ε = Error term (Assumed to be purely random)

Environmental Quality Reporting is expected to enhance positively relative to positive response of environmental variables and factors of corporate organizations. Environmental Quality Reporting is, in turn expected to enhance corporate profitability performance. It is however, part of this study to measure the nature of responsiveness through research instrument of questionnaire and secondary data statutory annual reports and financial statements of the sample companies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

The data for this study were from both primary and secondary sources. For this purpose, both cross-sectional content analyses (within and across sector companies) and longitudinal (ten-year annual report and financial statements) content analyses of 132 companies in their sub-sectors as in Nigeria Stock Exchange Commission (NSE) are employed.

The researcher has largely sourced for Company Annual Reports partly directly from Corporate Registrars of companies, request from the companies, visit to the Nigeria Stock Exchange (NSE) and the Manufacturing Association of Nigeria (MAN). Also, primary instrument through questionnaire administration to sample companies was utilized. Primary data were collected through structured questionnaire. The questionnaire was structured into four broad sections A to D; Section A was to address the nature of environmental operating expenditure, Section B, on environmental cost accounting system, Section C on issues of technology for product content and policies on environment and Section D on environmental failure costs and for pollution detection and prevention. It is considered that both research methods will be complementary and make for fuller evaluation of true state of environmental cost accounting and disclosure practice among sample companies.

3.2 Area of Study

More attention was focused on the Oil & Gas and the Manufacturing sectors of the Nigerian economy. It however spanned across ten (10) sub-sectors of the economy, such as the Oil & Gas sector (Upstream, Downstream and Indigenous Oil & Gas sub-sector), chemical & paint, breweries, building material, automobile & tyre, and agricultural sector. This study also focuses on manufacturing health care sub-sector, conglomerates and food & beverages sub-sectors of the economy.

In his work, Owolabi (2007) focused on environmental accounting in the Oil & Gas sector of Nigeria. This study therefore, further verifies both the Oil & Gas and manufacturing as it is considered that both the Oil & Gas and manufacturing generally impact adversely much on the environment through effluents and emission to the environment. To that effect, the study has considered secondary data through corporate annual reports of companies particularly those listed in the Nigerian Stock Exchange Market.

3.3 Population and Sampling Procedure

The Kyoto Convention is particularly important as a reference point in environment protection. As remarked earlier in this report, the Kyoto Convention was a follow-up on the Montreal Protocol which was on substances that deplete the ozone layer. The Kyoto Convention was designed to ensure that nations' aggregate anthropogenic carbon dioxide equivalent emissions of greenhouse gases do not exceed their assigned amount. Party nations and corporate organizations in the Kyoto Convention shall individually or jointly work towards

nations' attaining to the level of the expected reduction. Target is reduction of overall emission to at least 5% below the 1990 levels in the commitment period 2008 and 2012.

Although there have been prior international agreements on environment, but the Montreal Protocol in 1987 which was enforced in 1989 and the UN Framework Convention on Climatic Change in 1992 which was the immediate follow up to the Montreal Protocol are important reference years. However, the Kyoto Protocol adopted in December 1997 is made a focal determining date of environmental issues in corporate comparative analysis in this study. It has also, been remarked earlier in this study report that the issues on environment arising from the Kyoto Convention have implications for compliance to regulations on pollution prevention and environmental protection.

Estimated population of the manufacturing sector is about 59,500. According to Enyi (2007), the estimated size of all incorporated companies and registered business firms (manufacturing, non-manufacturing and service companies) through the Corporate Affairs Commission (CAC) of Nigeria in 2003 was about 595,000. These would have expanded by the day, which suggests that the figure could be more. We are also aware however, that many of these registered businesses either do not take off at all and some do wind up due to business collapse. Nevertheless, we assume a population of not less than 595,000 with all pluses and minuses. Since we are only interested in the manufacturing and oil and gas sectors, this figure may only safely be about 59,500 (i.e. one-tenth of the overall population). Population of 59,500 is therefore considered as population for this study (Enyi, 2007)

The estimated figure does include the 215 companies which are listed in the Nigeria Stock Exchange market (NSE) and Nigerian Securities Exchange Commission (SEC) which annual reports are statutorily published and made available to the general public.

This is inclusive of 8 other multinational companies which are not necessarily listed at the Nigerian Stock Exchange, but listed at other nations' capital markets. See Appendix for list of listed companies in Nigerian SEC. This latter information is a caution clause and a limiting factor as only Annual Reports and Financial Statements of listed companies are available to the general public for scrutiny. There may therefore, not be data and information from many companies which are not required statutorily to make public Annual Reports since the companies are not public limited companies which are listed in the Stock Exchange.

3.4 Sampling Technique and Size

In Guilford and Fruchter (1973), sample size determinant ascribed to Yaro Yamani is expressed in the formula stated as:

$n = N / \{1 + N (e^2)\}$

Where: n = Desired Sample Size

N = Total Population

e = Accepted error limit (0.05 on the basis of 95% confidence level)

Therefore, $n = 59{,}500 / (1 + 59{,}500 (0.05^2)$

$= 59{,}500 / (1 + 59{,}500 (0.0025)$

$= 59{,}500 / (1 + 148.75)$

$= 59{,}500 / 149.75$

Therefore, Sample Size = 397 companies.

We have applied stratified sampling in selecting our sample size for purpose of relevance of companies. Stratification sampling is done according to considered company activity impact on the environment with pollution emission, effluent and degradation. (See Appendices 8 and 11) We therefore have given more weight to the Oil and Gas and the

manufacturing sectors whose emission, effluent and degradation activities impact heavily on the environment. Also, there is modified sample size for companies which were either not in existence on or before 1997 or those which have ceased to exist in 2006. Verification and analysis of annual report secondary data was carried out for all of the outcome sample size. This will be ten (10) years from the year of the Kyoto Protocol, specifically 1997 – 2006.

Drawing from the works of Kerjecie and Morgan (1970) as cited in Amadii (2005), sample size of 5% of population is acceptable for generalization. However, a population of 397 is regarded as sizable enough for this study. Although, we will focus on the entire population, block or stratified sampling is adopted for purpose of relevance of Oil and Gas and the manufacturing companies.

Listed companies in the Nigeria Security Exchange Commission are shown in their sector categories with more weight on companies which are considered as environmental polluters whose emission, effluent and degradation activities impact heavily on the environment. These are the Oil and Gas and the manufacturing sectors comprising Agriculture, Automobile, Breweries, Building Materials, Chemical& Paints, Conglomerates, Food /Beverages & Tobacco and Industrial and Domestic Products. On Table 3.2, one hundred and thirty-two (132) companies i.e. 1320 company-years have been verified in this study. Also, see list of sample on Appendix 8. Multinational companies namely: Nigerian Breweries, Dunlop Nigeria Plc., Shell Petroleum Development Company (SPDC), Mobil Producing Nigeria (MPN) Unlimited, and Chevron Nigeria Limited (CNL) will be investigated. Other sectors are the agriculture, conglomerates, chemical & paints, breweries and others already specified.

The oil sector has significant foreign exchange earning capacity for Nigeria and according to Akinjide (2006), there are six major multinational company-players in the

Nigerian upstream sector with 60 – 40 joint venture sharing arrangement to Nigeria and each of the company respectively. The companies are shown on the Table 3.5 the oil and gas sector generates well over 90% of the foreign exchange earnings to Nigeria. The manufacturing companies, on the other hand, span across various sectors of the economy.

Table 3.1: Stakeholder Companies in the Upstream Oil and Gas Sector in Nigeria

	Company	**Barrel per day (bpd) Production**	**Share**
1	Shell Petroleum Development Company - English/Dutch	950,000	50%
2	Mobil Producing Nig. Ltd. - American	440,000	17%
3	Chevron Nigeria Limited - American	362,000	16%
4	Nigerian Agip Oil Company Limited - Italian		7%
5	Elf Petroleum Nig. Ltd.	127,000	5%
6	Texaco Overseas Petroleum Coy, Ltd. - American	60,000	3%
7	Independent Operators: These include Dubril Oil Coy; Consolidated Oil Ltd; Yinka Folawiyo Petroleum, Cavendish Petroleum, Amoco Nigeria Petroleum Company, Pan Ocean Oil Corporation, Ashland; Among others		2%
			100%

Source: Akinjide & Co. (2006): Nigeria: A Guide to the Nigerian Energy Sector – 30 January 1997; http:/www.mondaq.com/article.asp?articleid=20068searchresults=1

3.5 **Environmental Quality Reporting/ Disclosure Model Specification**

Environmental Reporting or Disclosure entails the release of a set of information relating to a company's past, current and future environment management activities, performance and financial implications. It also comprises information about the implications resulting from corporate environmental management decisions and actions. These may include issues such as expenditures or operating costs for pollution control equipment and facilities; future estimates of expenditures or operating costs for pollution control equipment and facilities. These may also include sites restoration costs, financing for pollution control equipment or facilities, present or potential litigation, air, water or solid waste releases; description of pollution control processes or facilities; compliance status of facilities; among others (Aert, Cormier and Magnan 2006). Soonawalla (2006) admits that the main environmental issues in financial reporting among others are environmental costs, whether to expense or capitalize, classification of environmental costs, disclosure on details and/or breakdowns about environmental costs, and treatment of environment-related financial impacts on assets. Others are treatment of liabilities and contingent liabilities and how to recognize these, measurement of liabilities and contingent liabilities, environmental reserves, provisions and charges to income, impact of accounting rules (GAAP) on corporate behaviour, and environment information to be disclosed in greater details.

Corporate organizations are engaging more actively in environmental disclosure in their annual financial statements. This is peculiar with more financially successful companies in both the United States and the United Kingdom. In the United States of America, SEC regulations and accounting standards require American companies to disclose environmental

information in annual reports. An International Public Accounting firm, KPMG, in 1999 (Gernon and Meek 2001:98), and Aert, Cormier and Magnam (2006:303) report from the KPMG's survey in 1996 that 'since 1993 the percentage of 100 companies in 12 leading industrial nations that mention the environment in annual reports have almost doubled to 69%'. Also, that '23% now produce separate environmental reports compared to 13% in 1993'. The same source reveals that Roche, a Swiss conglomerate is reputable for environmental disclosure on:

- Safety and Environmental protection expenditure
- Accidents and incidents
- Audit programme
- Developments in environmental policy
- Sustainable development, and
- Environmental remediation

The Danish company Novo Nordisk is also reputable, having in 1998 won awards for three consecutive times the European Environmental Reporting Awards. Most disclosures at the moment worldwide including Nigeria are still voluntary and the few companies are deliberating on policies to calculate costs. Sources of disclosure of information to company investors at the moment are through:

- Voluntary disclosure
- External non-firm sources of disclosure
- Mandatory disclosure

This study draws from the study of Campbell, Craven and Shrives (2003), who captured voluntary social disclosure over a longitudinal period in excess of 20 years (1975 – 1997) in three companies, the tobacco, brewing and retailing in the U.K. Measurable variables for Environmental Quality Model (EQR) were explored through both primary and secondary data. EQR is expressed in two models 1 and 2 as expressed:

3.6 EQR Model 1

$EQRM = f(TUR, PAT, C\ NA, EPS)$

$EQRM, (Y) = b_0 + b_1TUR + b_2PAT + b_3C\ NA + b_4EPS + \varepsilon$

The 'a priori' expectations are:

$b_1 > 0$; implying that the higher the TUR, the higher the Y.

$b_2 > 0$; implying that the higher the PAT, the higher the Y.

$b_3 > 0$; implying that the higher the C NA, the higher the Y.

$b_4 > 0$; implying that the higher the EPS, the higher the Y.

Variable Definitions

Y = Environmental Quality Reporting (as Dependent Variable) and others, set below as

Independent Variables

TUR = Annual Turnover of Company

PAT = Profit After Tax

C NA = Company Net Assets

EPS = Earnings Per Share

It has been said in the study that Environmental Quality Reporting is expected to enhance positively relative to positive response of environmental variables of corporate organizations. Also, that Environmental Quality Reporting is expected to enhance corporate profitability performance such as Turnover of company (TUR), Profit After Tax (PAT), Corporate Net Assets (CNA), and Earnings Per Share (EPS). It is part of this study to measure the nature of responsiveness through research instrument of questionnaire and secondary data statutory Annual Reports and Financial Statements of the sample companies.

3.7 EQR Model 2

As stated, we consider the theory of Hansen and Mowen (2000) Environmental Quality Cost Model the components or variables of Environmental Pollution Prevention Costs, Environmental Detection Costs, Environmental Internal Failure Costs and Environmental External Failure Costs. Environmental Quality Reporting (EQR) is expressed as company's responsiveness to the mentioned variables aforementioned. Environmental measurement and rating variables and modification in this research are agreeable to Aerts, Cormier and Magnan (2006) in which environmental coding comprise of 37 items are grouped into categories. (See Data Descriptions in Section 3.6)

Therefore:

EQR = f(Environmental Operating Expenditure/Costs Responsiveness (EOPEX), Environmental Capital Expenditure/Costs Responsiveness (ECAPEX), Environmental Technology Content for production Responsiveness (COTEC), Environmental Pollution Detection Expenditure/Costs Responsiveness (PODET), Environmental Pollution Prevention

Expenditure/Costs Responsiveness (POPREV), and Environmental Externality Expenditure/Costs Responsiveness (EEXTC).

EQR (Y) = f(EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC)

Where, $Y = a_0 + a_1EOPEX + a_2ECAPEX + a_3COTEC + a_4PODET +$

$a_5POPREV + a_6EEXTC + \varepsilon$

Variable Definitions

Y = EQR

a_0 = Constant/Intercept

EOPEX = Environmental Operating Expenditure/Costs Responsiveness

ECAPEX = Environmental Capital Expenditure/Costs Responsiveness

COTEC = Environmental Technology Content for production Responsiveness PODET = Environmental Pollution Detection Expenditure/Costs Responsiveness

POPREV = Environmental Pollution Prevention Expenditure/Costs Responsiveness

EEXTC = Environmental Externality Expenditure/Costs Responsiveness

ε = Error term (Assumed to be purely random)

The 'a priori' expectations are:

$a_1 > 0$; implying that the higher the EOPEX, the higher the Y.

$a_2 > 0$; implying that the higher the ECAPEX, the higher the Y.

$a_3 > 0$; implying that the higher the COTEC, the higher the Y.

$a_4 > 0$; implying that the higher the PODET, the higher the Y.

$a_5 > 0$; implying that the higher the POPREV, the higher the Y.

$a_6 > 0$; implying that the higher the EEXTC, the higher the Y.

As remarked earlier, Environmental Quality Reporting is expected to enhance positively, relative to positive response of environmental variables of corporate organizations. It is part of this study to measure the nature of responsiveness through research instrument of questionnaire and secondary data statutory Annual Reports and Financial Statements of the sample companies.

In the study we explored the level of existence or non-existence of environmental costs reporting/disclosure in the sample companies, whether of current or capital expenditure. Also, we explored the level of independence of tracking of all costs impacting on the environment through content analysis of company annual environmental reporting. The variables are summed up (i.e. additive) to establish the responsiveness of environmental costing and reporting of corporate organizations in the category sectors of Oil & Gas and the Manufacturing.

3.8 Data descriptions

Environmental Internal Failure costs .i.e. Environmental Operating Expenditure/Costs Responsiveness (EOPEX) such as follows:

- costs for operating pollution control equipment
- costs incurred for treating and disposing of toxic wastes
- maintaining pollution prevention equipment
- licensing facilities for producing contaminants
- costs resulting from recycling scraps

Environmental External Failure costs i.e. Environmental Externality Expenditure/Costs Responsiveness (EEXTC) such as follows:

- costs for cleaning up polluted natural land, lake and environment
- cleaning up oil spills
- cleaning up contaminated soil
- settling personal injury claims which are environment related, among others.
- Restoring land to natural state

Environmental Pollution Prevention costs i.e. Environmental Pollution Prevention Expenditure/Costs Responsiveness (POPREV) which include costs for:

- evaluating and selecting pollution control equipment
- quality environment consumables
- designing processes and products
- carrying out environmental studies
- auditing environmental risks
- environmental management systems
- recycling products
- obtaining ISO 14001 certificate

Environmental Detection Costs i.e. Environmental Pollution Detection Expenditure/ Costs Responsiveness (PODET) which include costs for:

- auditing environmental activities
- inspecting products and processes
- developing environmental performance measures
- testing contamination and measuring contamination level

ECAPEX = Other Environmental Capital Expenditure/Costs Responsiveness

COTEC = Environmental Technology Content for production Responsiveness

3.9 Instrument Reliability and Validity

Instrument Reliability

Secondary data instrument are the Companies' Annual Reports and Financial Statements. Annual Reports are reliable statutory reports, used in similar works (Campbell, Craven and Shrives: 2003:566). It is firmly asserted that the Annual Reports are documents of companies which are produced regularly which comply with statutory standards. They also serve as the most important documents for the organization's construction of its own social image. Audited Annual Reports and Financial Statements have reliability and credibility. For this purpose, both cross-sectional analyses (within and across sector companies) and longitudinal (ten-year annual financial) survey among 132 sample companies of 1320 company-years was carried out (Table 3.2).

Questionnaire instrument for primary data were used in the study. Questionnaires were first administered in the Federal Ministry of Environment, and the Department of Petroleum Resources (DPR) of the Federal Ministry of Petroleum before the target group of Oil and Gas and Manufacturing Companies. The Split-Half Reliability method was used. The total of the even number questions and the total of the odd number questions were compared to determine a correlation. This yielded a correlation of 0.96 which is considered a high level of reliability. (See table on Appendix 15)

Instrument Validity

For Instrument validity, face-content validity, expert advice and best practice in environmental accounting were combined. In these regards, the views of experts and specialists in the Federal Ministry of Environment and the Department of Petroleum Resources (DPR) were sought on validity of questionnaire research instrument. Besides, past studies on environment conducted at the U.S. Environmental Protection Agency were consulted. Typical is the Tellus Institute Benchmark Survey of Management Accountants on Environmental Costs Accounting (U.S. Environmental Protection Agency:1995). The works of Hansen and Mowen (2000:666-684) and Campbell, Craven and Shrives (2003:558-581) partly constitute bases for factor variables. The contents of questionnaires were reviewed on several occasions by the Supervisors of this work as the work progressed.

3.10 Estimation Technique / Rating Scale:

Relevant Likert scale rating (1-5) for primary data was adopted in assessing environmental sustainability level in sample companies. The value of 5 represents the highest environmental sustainability level and 1 represents the lowest. For secondary data, the scale rating (1- 3) applied in assessing environmental reporting level in sample companies were:

	Rate/Score
Environmental item described in quantitative and/or monetary terms	3
Environmental item specifically described	2
Environmental item discussed in general terms (neither quantified nor specific)	1
Environmental item not in anyway referred to	0

3.11 Technique for Data Analyses

The study explores environmental costs reporting and disclosure content from companies in the Oil and Gas Sector as well as the Manufacturing Sector. In this regard, Environmental Reporting reflects the quality rather than merely the quantity. As observed in the Estimation/Rating technique, quality estimation is measured by both the quantity of the reporting in terms of number of words and quality of the number of words measured through Environmental item described in quantitative and/or monetary terms, Environmental item specifically described and Environmental item discussed in general terms (neither quantified nor specific). No score is attached to reporting which does not have environmental content in anyway. Quantitative/monetary reporting or disclosure is regarded as of more quality than mere indicative or descriptive.

The test statistics applied in this study are the Descriptive statistics, t-test and the ANOVA. Also, the Multivariate Regression was applied. Both secondary and primary data in the study meet with assumptions for the T- test and ANOVA, which state as follows:

- data are interval or ratio type
- sample groups as randomly and independently selected
- normality distribution in the population from which sample is selected., and
- standard deviations and variability fairly similar.

Specifically, test statistics and analysis for Hypotheses 1 and 2, Null (H_0) were t-test, Paired Sample test correlation, Pearson correlation, One-Way ANOVA and Descriptive Statistics. For Hypothesis 4 Null (H_0), the F-Statistic, in addition to Pearson correlation, ANOVA and Descriptive Statistics were applied. Finally, those applied on Hypothesis 3, Null (H_0), were Descriptive Statistics, ANOVA and Regression Analysis.

We have in the study endeavoured to make our sample sizes as equal as possible so as

to minimize variability. While normality of data distribution has been ascertained for EOPEX, ECAPEX, COTEC and POPREV, fair normality goes for PODET and EEXTC. It is generally accepted that both ANOVA and T-tests are considered as robust parametric techniques in which statistical data not fulfilling particularly normality requirement will have relatively minor consequences (Vaughan: 2001, Izedonmi: 2005).

Table 3.2: Actual Available Companies by Year and Sector

	Oil & Gas	Manufacturing	Total
1997	20	112	132
1998	20	112	132
1999	20	112	132
2000	20	112	132
2001	20	112	132
2002	20	112	132
2003	20	112	132
2004	20	112	132
2005	20	112	132
2006	20	112	132
Total	**200**	**1120**	**1320**

Source: Researcher's Work, 2009

The quality of environmental reporting and/or the responsiveness of environmental costing and reporting of corporate organizations in the sectors of Oil and Gas and the Manufacturing are the tests for H_1 and H_2; which state:

1. H_0. Environmental expenditures are not charged independently of other expenditures in the Oil & Gas and Manufacturing sectors.

2. H_0. The non-application of environmental cost accounting has significantly affected the tracking of externality costs in the Oil & Gas and Manufacturing sectors

The Multivariate Linear Regression Analysis attempts to describe relationship of environmental accounting reporting/disclosure to identifiable determinant variables such as Turnover (TUR), Profit After Tax (PAT), Corporate Net Asset (C NA) and Earnings Per Share (EPS). The four determinant variables which are individually proxies for company economic performance are expected to influence and affect positively corporate Environmental Quality Reporting (EQR). Theory supporting environmental accountability and sustainable clean environment culminates on the desirability of the stakeholders and the general public for corporate organization's products and activities. It has been noted earlier that ethical investors will only invest in ethical companies; also ethical companies have marketing advantage if they strategically position themselves environmentally. Recent trend reveals that ethical companies stand at advantage for corporate financing.

While OLS Multiple Regression Analysis is test for H_3, overall measurement of environmental quality and pattern of quality of environmental reporting in the sectors are tests for H_4 which are stated below:

3. H_0. The application of environmental accounting practice in the Oil & Gas and Manufacturing sectors does not impact on company performance in Nigeria.

4. H_0 Environmental accounting disclosure does not take the same pattern among the companies in Nigeria.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 SOURCES OF DATA COLLECTION

Sources of Secondary Data

Critical source of secondary data were disclosures and reporting in corporate annual reports. Annual Reports and Financial Statements were largely utilized in the works of Campbell, Craven and Shrives (2003); also in Lindblom, (1994); Gray, R; Kouhy, R and Lavers, S. (1995); Trotman and Bradley, (1981); Guthrie and Parker, (1990); Patten, (1991); Hacksten and Milne, (1996); and Adams, C.A, Hill, W.Y and Roberts, C.B. (1998). Owolabi (2007) also utilized company annual reports in his work. It is asserted that the Annual Reports are documents of companies which are produced regularly which comply with statutory standards. They also serve as the most important documents for the organization's construction of its own social image, and audited Annual Reports and Financial Statements have reliability and credibility.

The researcher has largely sourced for Company Annual Reports partly from Corporate Registrars of companies and also through direct request through correspondence to each

company alongside questionnaires posted to them. The researcher visited the Nigeria Stock Exchange (NSE) for available financial data and also the Manufacturing Association of Nigeria (MAN) for more Annual Reports Data were extracted from corporate annual reports starting from the year of the Kyoto Protocol 1997 to 2006 (10 years). Environmental measurement and rating variables and modification in this research are agreeable to Aerts, Cormier and Magnan (2006) in which environmental coding comprise of 37 items which are grouped into six categories, namely: economic factors, laws and regulations, pollution abatement, sustainability development, land remediation and contamination and environmental management.

Secondary Data gathering were not restricted to Annual Financial Reports but were also explored from corporate websites of sample companies for reporting Environment Policies. It is discovered that certain companies report summaries in Annual Financial Reports while detailed environmental reporting is contained in corporate register website particularly for certain successful multinational companies.

Likert scale rating of values 1-3 for secondary data which were applied in assessing environmental reporting level in companies are shown in the methodology section.

Sources of Primary Data

Primary data were collected through structured questionnaire which consists of close and open-ended questions. The questionnaire was structured into four broad sections A to D; Section A was to address nature of environmental operating expenditure, Section B, on environmental cost accounting system, section C to address issue of technology for product content and policies on environment and Section D all environmental failure costs and for pollution detection and prevention.

Questionnaires were therefore administered in the sample companies and interviews conducted in relevant environmental regulation government agencies. Regulatory Agencies include the Federal Ministry of Environment-FMEnv (former Federal Environmental Protection Agency-FEPA), Lagos State Ministry of Environment (LAMEnv), Lagos State Environmental Protection Agency (LASEPA) and Bayelsa State Ministry of Environment (BSMEnv). The Researcher also engaged the Department of Petroleum Resources (DPR) the Agency saddled with the responsibility for regulating the oil and gas sector in Nigeria. In close questions there are limited or restricted responses to options while the open-ended questions are those which allow the respondents to provide more details or explanations to the issues at stake. Likert scale rating for primary data was values 1-5.

Secondary Data

Calculated sample size of companies was 397 and for ten years is 3970 company years. Actual companies available for verification were 132 i.e. 1320 company-years (See Table 4.1(a & b) and Appendix 8 for Analyses). The Oil & Gas are represented by 200 company-years for environmental reporting and 1120 company-years represent the manufacturing sector. While secondary data for 1120 company years were verified, those having environmental reporting was a total of 199 company–years (15.1%), others had no reports conveying environmental reports Those conveying environmental reports constitutes representative of the two sectors, 93 company-years (46.5%) belonging to the Oil and gas sector and 106 (9.5%) company-years to the manufacturing sector. Data analysis were therefore, based on 199 company years.

Table 4.1a: Environmental Quality Reporting Summary in Secondary Data in the Sub-sectors

Oil and Gas Sector	**Company Years**	
Petroleum Marketing Companies	47	
Foreign listing Oil and Gas	35	
Indigenous Oil and Gas	11	
	93	
Manufacturing Sector		
Automobile and Tyres		4
Brewery	16	
Building Material companies	14	
Chemical and Paint	17	
Conglomerates	14	
Food and Beverages Companies	29	
Health Care	12	
	106	
Total	**199**	
	=======	

TABLE 4.1b: Summary of Data (Secondary and Primary) Analysed in Companies

Secondary Data Companies	**Company Years**	**Company Years %**	**Company**	**Company %**	**Oil and Gas Company Years**	**Manufacturing Company Years**
Calculated Sample Size	3970	100%	397	100%	200	3770
Actual Companies Available	1320	33.2%	132	33.2%	200	1120
Actual Environmental Reported Companies	199	15.1%	38	29%	93 (46.5%)	106 (9.5%)
Environmental Non-Reported Companies	1121	84.9%	94	71%	107 (53.5%)	1014 (90.5%)
Primary Data Questionnaires on Primary Data distributed to Companies	Not Applicable	Not Applicable	850	100%	183Q (21.5%)	668Q (78.5%)
Questionnaires on Primary Data received from Companies	Not Applicable	Not Applicable	129	15..2%	35Q (19.1%)	94Q (14.1%)

Source: Researcher's Work, 2009

4.2 FACTOR ANALYSIS OF PRIMARY DATA

Factor Analysis is not a test for hypothesis but a technique for data reduction from large data usually summarized into groups to represent smaller set of factors or components where

so much data exist. The questionnaire was structured into four broad sections A to D; Section A was to address the nature of environmental operating expenditure, Section B, on environmental cost accounting system, Section C on issues of technology for product content and policies on environment and Section D on environmental failure costs and for pollution detection and prevention. In this study, the questionnaire primary data were subjected to Factor Analysis To ensure suitability of data for factor analysis the variable categories were subjected to principal components analysis (PCA) using the SPSS. On the inspection of the correlation matrix, reveals the coefficients which were 0.3 and above and were the relevant coefficients. In the Factor Analysis, the Kaiser- Meyer-Oklin value (KMO) was 0.834, KMO > 0.60 which indicates Sampling Adequacy (Kaiser, 1970, 1974; Pallant, 2004; Brace, Kemp and Snelgar, 2006); also, the Bartlett's Test of Sphericity have significance $p < 0.05$, indicates adequate and supportive of the factor analysis (Bartlett, 1954; Pallant, 2004; Brace, Kemp and Snelgar, 2006). (Full test of Factor Analysis is in Appendix 9).

Principal Components Analysis reveals one component with eigenvalue exceeding 1, value of 3.383 which explains 56.4% of the variance. An inspection of the Scree Plot also reveals a clear break after the first component. This results in a simple regression relationship. However, it is considered reasonable and more robust to adopt the multivariate components rather than a univariate component. To reveal the impact of multivariate of environmental responsiveness in the corporate organizations, these are therefore accommodated in the regression function. The Component Score Coefficient Matrix table reveals EOPEX coefficient as -.226, ECAPEX as -.229, COTEC .237, PODET .225, POPREV .215 and EEXTC as .197.

EQR = -.226EOPEX - .229ECAPEX + .237COTEC + .225PODET

+ .215POPREV + .197EEXTC

4.3 SECONDARY DATA ANALYSIS

On Table 4.2, Environmental reporting is an attempt to evaluate not only the quantity of environmental reporting but also the quality. Reporting is described as indicative content (indicont) if reporting is merely indicating environment clause i.e. neither quantified nor specific. Environmental reporting having specific description content is described as 'descont', and environmental item having quantitative and/or monetary term content is described as 'quantcont'.

Environmental reporting and disclosure reflect those of dominant companies in the sub-sectors of petroleum marketing, indigenous Oil & Gas, foreign listing Oil & Gas companies. Those of the manufacturing companies were dominated by the sub-sectors of automobile and tyres, breweries, building materials, chemical and paint, and the conglomerates. Others are food and beverages, and the health care sub-sectors. Those without environmental reports are companies in the sub-sectors of agriculture, aviation, construction, foot wear, industrial/domestic product manufacturing, packaging manufacturing, printing and publishing, textiles manufacturing, and the second-tier securities sub-sectors. The sub-sectors were completely excluded from the data as a result of no environmental reporting or disclosure whatsoever.

Panel D of Table 4.2 reveals mean environmental reporting of 933.55 and 693.94 for the manufacturing and the oil and gas sectors respectively. The oil and gas however have highest environmental reporting of maximum of 8,150 as against 5,100 for the manufacturing sector. There are lowest reporting of 25 and 26 for the oil and gas and the manufacturing respectively. Disclosure of environmental reporting in the context of mere indicative content or

descriptive improved status, or quantitative and monetary content is evident in Panel A. In this respect, means of overall of environmental disclosure are quantitative 1,185.88, descriptive 1,012.09, and mere indicative 92.92. Standard deviation is highest for descriptive content 1,485.863, quantitative content 1,173.374 and indicative content of 75.691.

Panels B and C further disclose details of environmental disclosure. Maximum reporting of 8,150 occurred in foreign listing oil and gas companies in Panel B. Typical companies of such high quality and quantitative reporting and disclosures are Shell Petroleum Development Company (SPDC) and Exxon Mobil. Next to the foreign listing oil and gas sub-sector is food and beverages and health care sub-sectors. The dominating companies in this high category of environmental reporting and disclosure are Nestle Nigeria Plc for the food and beverages sub-sector and GlasxoSmithkline Consumer Nigeria Plc for the health care sub-sector (Appendix 10).

Table 4.2: Environmental Quality Reporting

PANEL A Environmental Quality Reporting in Combined Oil and Gas and Manufacturing Sectors

REPQUALS	Mean	N	Std. Deviation
Indicont	92.92	49	75.691
Descont	1012.09	109	1485.863
Quantcont	1185.88	41	1173.374
Total	821.57	199	1289.433

PANEL B Environmental Quality Reporting Separately in the Oil and Gas and Manufacturing Sectors

REPQUALS	Mean	N	Std. Deviation	Sum	Minimum	Maximum	Range
Indicontog	122.96	28	83.899	3443	25	253	228
Descontog	922.93	45	1432.255	41532	84	8150	8066
Quantcontog	978.05	20	960.524	19561	327	4140	3813
Indicontm	52.86	21	36.032	1110	26	124	98

Descontm	1074.7	64	1530.496	68786	90	5100	5010
Quantcontm	8	21	1338.959	29060	120	3540	3420
Total	1383.8	199	1289.433	163492	25	8150	8125
	1						
	821.57						

Indicontog is environmental report disclosure of indicative content in the oil and gas sector, Descontog is descriptive content in the oil and gas sector, and Quantcontog is quantitative content in the oil and gas sector. Also, Indicontm is indicative content in the manufacturing sector, Descontm is descriptive content in the manufacturing sector and Quantcontm is quantitative content of environmental report disclosure in the manufacturing sector.

PANEL C Environmental Quality Reporting Summary in the Sub-sectors

Sub-sectors	Mean	N	Std. Deviation	Minimum	Maximum	Range
Pm	439.96	47	384.907	25	1348	1323
flog	1188.86	35	1714.753	84	8150	8066
iog	204.36	11	72.401	92	253	161
automt	124.00	4	.000	124	124	0
brew	183.44	16	165.338	27	440	413
buidm	739.57	14	372.501	258	1016	758
chempt	287.65	17	144.678	120	480	360
congl	206.07	14	129.919	45	364	319
foodb	1764.90	29	1897.400	37	5100	5063
healthc	2184.50	12	1814.861	26	4520	4494
Total	821.57	199	1289.433	25	8150	8125

Table sub-sector descriptions are (pm) which is petroleum marketing sub-sector (oil and gas), (flog) is foreign listing oil and gas, and (iog) is the indigenous oil and gas sub-sector. Sub-sectors in the manufacturing sector are (automt) which is automobile and tyres sub-sector, (brew) for the breweries, (buildm) for the building materials, (chempt) for chemical and paint sub-sector, and (congl) for the conglomerates. Others still in the manufacturing sector are (foodb) for food and beverages and (heathc) for the health care sub-sector.

PANEL D Environmental Quality Reporting Summary for Sectors

Sub-sectors	Mean	N	Std. Deviation	Minimum	Maximum	Range
Oil & Gas	693.94	93	1147.216	25	8150	8125
Manufacturing	933.55	106	1398.219	26	5100	5074
Total	821.57	199	1289.433	25	8150	8125

4.4 TEST FOR HYPOTHESIS 4 (H_0)

4. H_0 Environmental accounting disclosure does not take the same pattern among the companies in Nigeria.

In Panel A of Table 4.3, shows a high significance of the non-equality of the between groups and within groups of sectors environmental reporting and disclosure, Sig. $p<0.05$. F value is 7.029 at degree of freedoms of 9 and 189 for between group and within groups respectively. Furthermore, Panel B shows mean difference of reporting/disclosure in the multiple comparisons among sub-sectors at 95% degree confidence interval. Mean differences are significant only among the sub-sectors of petroleum marketing to food and beverages $p = 0.006$, and health care at 0.011; breweries sub-sector to food and beverages at $p = 0.024$ and to health care at $p = 0.016$. Other comparisons of significant mean differences are the chemical and paints compared to food and beverages at $p = 0.042$, healthcare at $p = 0.027$; conglomerates compared to healthcare at $p = 0.027$ among others. The mean differences are not significant in most of the environmental reporting companies. Table 4.1b however, reveals that while 38% of the sample size companies do report on environment whether at the level of 'Indicont', 'Descont' or 'Quantcont', 71% of sample size companies do not report on environment at all. Besides, the mean differences of the Between Group and Within Group of sample size companies show high significance, i.e. Sig. 0.001, $p<0.05$. This is an indication of a confirmation of Hypothesis 4: that environmental accounting disclosure does not take the same pattern among companies in Nigeria. This means that certain companies report and disclose environmental activities and issues at high quality degree, some at low quality level and others, no environmental quality reporting whatsoever. Those companies in the first category of high quality environmental reporting and disclosure are mainly the multinationals.

Most other companies minimally report in their financial statements mere indicative reporting. The columns of the minimum and maximum of environmental reporting in Panel C attest to this.

Table 4.3: Test of Hypothesis

PANEL A
One Way ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	82559370	9	9173263.358	7.029	.000
Within Groups	2.47E+08	189	1304989.527		
Total	3.29E+08	198			

PANEL B Dependent Variable Environmental Reporting : Scheffe

(I) Sub-sector	(J) Sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Pm	flog	-748.90	255.051	.476	-1811.80	314.00
	iog	235.59	382.624	1.000	-1356.95	1830.14
	automt	315.96	594.990	1.000	-2163.60	2795.52
	brew	256.52	330.647	1.000	-1121.42	1634.46
	buidm	-299.61	347.821	1.000	-1749.12	1149.89
	chempt	152.31	323.311	1.000	-1195.05	1499.67
	congl	233.89	347.821	1.000	-1215.62	1683.39
	foodb	-1324.94*	269.751	.006	-2449.10	-200.78
	healthc	-1744.54*	369.479	.011	-3284.31	-204.78
flog	pm	748.90	255.051	.476	-314.00	1811.80
	iog	984.49	394.868	.717	-661.08	2630.07
	automt	1064.86	602.937	.958	-1447.82	3577.53
	brew	1005.42	344.742	.487	-431.26	2442.10
	buidm	449.29	361.246	.997	-1056.17	1954.74
	chempt	901.21	337.712	.625	-506.17	2308.59
	congl	982.79	361.246	.596	-522.67	2488.24
	foodb	-576.04	286.854	.907	-1771.47	619.39
	healthc	-995.64	382.145	.659	-2588.19	596.91
Iog	pm	-235.59	382.624	1.000	-1830.14	1358.95
	flog	-984.49	394.868	.717	-2630.07	661.08
	automt	80.36	666.995	1.000	-2699.27	2860.00
	brew	20.93	447.434	1.000	-1843.71	1885.56
	buidm	-535.21	460.271	.998	-2453.34	1382.92
	chempt	-83.28	442.040	1.000	-1925.44	1758.87
	congl	-1.71	460.271	1.000	-1919.84	1916.42

	foodb	-1560.53	404.518	.103	-3246.32	125.26
	healthc	-1980.14	476.849	.052	-3967.35	7.08
automt	pm	-315.96	594.990	1.000	-2795.52	2163.60
	flog	-1064.86	602.937	.958	-3577.53	1447.82
	iog	-80.36	666.995	1.000	-2860.00	2699.27
	brew	-59.44	638.599	1.000	-2720.74	2601.86
	buidm	-615.57	647.658	1.000	-3314.62	2083.48
	chempt	-163.65	634.834	1.000	-2809.24	2481.95
	congl	-82.07	647.658	1.000	-2781.12	2616.98
	foodb	-1640.90	609.300	.611	-4180.09	898.30
	healthc	-2060.50	659.543	.376	-4809.08	688.08
brew	pm	-256.52	330.647	1.000	-1634.46	1121.42
	flog	-1005.42	344.742	.487	-2442.10	431.26
	iog	-20.93	447.434	1.000	-1885.56	1843.71
	automt	59.44	638.599	1.000	-2601.86	2720.74
	buidm	-556.13	418.061	.994	-2298.36	1186.09
	chempt	-104.21	397.902	1.000	-1762.43	1554.01
	congl	-22.63	418.061	1.000	-1764.86	1719.59
	foodb	-1581.46*	355.755	.024	-3064.03	-98.89
	healthc	-2001.06*	436.246	.016	-3819.08	-183.05

Continuation table: Dependent Variable Environmental Reporting: Scheffe

		Mean Difference			95% Confidence Interval	
(I) Sub-sector	(J) Sub-sector	(I-J)	Std.Error	Sig.	Lower Bound	Upper Bound
buidm	pm	299.61	347.821	1.000	-1149.89	1749.12
	flog	-449.29	361.246	.997	-1954.74	1056.17
	iog	535.21	460.271	.998	-1382.92	2453.34
	automt	615.57	647.658	1.000	-2083.48	3314.62
	brew	556.13	418.061	.994	-1186.09	2298.36
	chempt	451.92	412.283	.999	-1266.22	2170.07
	congl	533.50	431.772	.997	-1265.87	2332.87
	foodb	-1025.33	371.770	.575	-2574.64	523.99
	healthc	-1444.93	449.403	.331	-3317.77	427.91
chempt	pm	-152.31	323.311	1.000	-1499.67	1195.05
	flog	-901.21	337.712	.625	-2308.59	506.17
	iog	83.28	442.040	1.000	-1758.87	1925.44
	automt	163.65	634.832	1.000	-2481.95	2809.24
	brew	104.21	397.902	1.000	-1554.01	1762.43
	buildm	-451.92	412.283	.999	-2170.07	1266.22
	congl	81.58	412.283	1.000	-1636.57	1799.72
	foodb	-1477.25*	348.947	.042	-2931.45	-23.05
	healthc	-1896.85*	430.712	.027	-3691.80	-101.90
congl	pm	-233.89	347.821	1.000	-1683	1215.62
	flog	-982.79	361.246	.596	-2488.24	522.67
	iog	1.71	460.271	1.000	-1916.42	1919.84
	automt	82.07	647.658	1.000	-2616.98	2781.12
	brew	22.63	418.061	1.000	-1719.59	1764.86
	buidm	-533.50	431.772	.997	-2332.87	1265.87
	chempt	-81.58	412.283	1.000	-1799.72	1636.57
	foodb	-1558.83*	371.770	.047	-3108.14	-9.51

	healthc	-1978.43*	449.403	.027	-3851.27	-105.59
foodb	pm	1324.94*	269.751	.006	200.78	2449.10
	flog	576.04	286.854	.907	-619.39	1771.47
	iog	1560.53	404.518	.103	-125.26	3246.32
	automt	1640.90	609.300	.611	-898.30	4180.09
	brew	1581.46*	355.755	.024	98.89	3064.03
	buidm	1025.33	371.770	.575	-523.99	2574.64
	chempt	1477.25*	348.947	.042	23.05	2931.45
	congl	1558.83*	371.770	.047	9.51	3108.14
	healthc	-419.60	392.108	.999	-2053.67	1214.47
healthc	pm	1744.54*	369.479	.011	204.78	3284.31
	flog	995.64	382.145	.659	-596.91	2588.19
	iog	1980.14	476.849	.052	-7.08	3967.35
	automt	2060.50	659.543	.376	-688.08	4809.08
	brew	2001.06*	436.246	.016	183.05	3819.08
	buidm	1444.93	449.403	.331	-427.91	3317.77
	chempt	1896.85*	430.712	.027	101.90	3691.80
	congl	1978.43*	449.403	.027	105.59	3851.27
	foodb	419.60	392.108	.999	-1214.47	2053.67

*The mean difference is significant at the 0.05 level

Table 4.4: Regression

PANEL A Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Reporting Quality	868.08	1350.692	177
TURNOVER	6594600	12207751.04	177
PAT	482961.9	1642659.299	177
NETASSET	3034250	5773722.713	177
EPS	3.5613	37.76224	177

PANEL B Correlations

		Reporting Quality	TURNOVER	PAT	NETASSET	EPS
Pearson Correlation	Reporting Quality	1.000	.086	.090	.131	.008
	TURNOVER	.086	1.000	.840	.887	.320
	PAT	.090	.840	1.000	.834	.478
	NETASSET	.131	.887	.834	1.000	.500
	EPS	.008	.320	.478	.500	1.000
Sig. (1-tailed)	Reporting Quality	.	.128	.118	.041	.460
	TURNOVER	.128	.	.000	.000	.000
	PAT	.118	.000	.	.000	.000
	NETASSET	.0.41	.000	.000	.	.000
	EPS	.460	.000	.000	.000	.
N	Reporting Quality	177	177	177	177	177
	TURNOVER					
	PAT					
	NETASSET					
	EPS					

PANEL C Model Summary – PAT as variable predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	129[a]	.017	.010	1064.085

a. Predictors (Constant), PAT

PANEL D Model Summary – All variables as predictors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.173[a]	.030	.008	1345.549

a. Predictors (Constant), TURNOVER, PAT, NETASSET, EPS

PANEL E ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	9661813	4	2415453.319	1.334	.259[a]
	Residual	3.11E+08	172	1810623.410		
	Total	3.21E+08	176			

a. Predictors (Constant), TURNOVER, PAT, NETASSET, EPS
b Dependent Variable: Environmental Quality Reporting

PANEL F Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 Intercept	777.415	121.012		6.424	.000		
TURNOVER	-2.49E-05	.000	-.225	-1.171	.243	.152	6.568
PAT	2.707E-05	.000	.33	.213	.831	.237	4.219
NETASSET	8.468E-05	.000	.362	1.897	.060	.155	6.460
EPS	-4.188	3.402	-.117	-1.231	.220	.623	1.604

a. Dependent Variable, Environmental Quality Reporting

PANEL G Collinearity Diagnostics

			Variance Proportions

Model	Dimension	Eigenvalue	Condition Index	(Intercept)	TURNOVER	PAT	NETASSET	EPS
	1	3.227	1.000	.02	.01	.02	.01	.02
	2	.946	1.847	.38	.00	.01	.00	.29
	3	.611	2.298	.41	.02	.04	.00	.44
	4	.148	4.666	.19	.07	.88	.22	.01
	5	6.833E-02	6.872	.00	.89	.06	.77	.25

a. Dependent Variable: Environmental Quality Reporting

4.5 EQR MODEL 1 REGRESSION FUNCTION AND TEST FOR HYPOTHESIS 3 (H_0)

Panels A – G of Table 4.4 is Multivariate Regression for Model 2 Environmental Reporting and Disclosure in the Oil and Gas and the Manufacturing sectors.

EQRM = f(a, TUR, PAT, C NA, EPS, ε)

EQRM, $Y = b_0 + b_1TUR + b_2PAT + b_3C\ NA + b_4EPS + \varepsilon$

The 'a priori' expectations are:

$b_1 > 0$; implying that the higher the TUR, the higher the Y.

$b_2 > 0$; implying that the higher the PAT, the higher the Y.

$b_3 > 0$; implying that the higher the C NA, the higher the Y.

$b_4 > 0$; implying that the higher the EPS, the higher the Y.

We explored the level of existence or non-existence of environmental costs reporting/disclosure in sample companies, whether of current or capital expenditure. Also, we explored the level of independence of tracking of all costs impacting on the environment through content analysis of company annual environmental reporting. The variables are summed up (i.e. additive) to establish the responsiveness of environmental costing and reporting of corporate organizations in the category sectors of Oil and Gas and the Manufacturing. Pearson Correlation of Environmental Reporting to Turnover (TUR) is .086, Profit After Tax (PAT) is .090, Company Net Assets (C NA) is .131 and Earnings Per Share

(EPS) is .008. These are however at non-significant levels of 0.128 for TUR, 0.118 for PAT, and 0.460 for EPS. It is however significant, 0.041 for C NA.

In Panel C, R-Square and Adjusted R-Square of PAT as predictor variable are 0.017 and 0.01 respectively, while R square and Adjusted R Square in Panel D showing all predictor variables are however 0.03 and 0.008. Panel E reveals F value of 1.334, at Sig. 0.259, $p>0.05$. This is non-significant. Panel F of Table 4.4 shows predictor variables of Turnover (TUR) indicating t value -1.171, at significant level of 0.243 and Beta value of -0.225; Profit After Tax (PAT) indicating t value of 0.213 at significant level of 0.831 and Beta value of 0.033. Predictor Company Net Asset (C NA) has t value of 1.897 at significant level of 0.061 and Beta value of 0.362; and Earnings Per Share (EPS) have t value of -1.231 at significant level of 0.220 and Beta value of -0.117. Correlation is low between EQR and TUR, PAT, C NA and EPS.

A significant correlation indicates a reliable relationship, not necessarily a strong correlation (with enough subjects, a very small correlation can be significant). According to Cronk (2004), generally, correlations greater than 0.7 are considered strong and correlations less than 0.3 are considered weak. Also, correlations between 0.3 and 0.7 are considered moderate. The above Model function is therefore, valid with the coefficients stated as follows:

EQRM, $Y = b_0 + b_1TUR + b_2PAT + b_3C\ NA + b_4EPS + \varepsilon$

EQRM^1, $Y^1 = 777.415 – 2.49E\text{-}05TUR + 2.707E\text{-}05PAT + 8.468E\text{-}05C\ NA – 4.188EPS + \varepsilon$

Although, the above EQR Model 1 is valid, the abysmally low Adjusted R Square level of 0.008 (0.8%), negative and low Beta values of predictors are indications of current low level of environment reporting and disclosure in most companies in Nigeria. Therefore, the null of Hypothesis 3 (H_0) is accepted which means that environmental accounting non-practice does

not impact on Companies' performance in Nigeria at the moment.

4.6: PRIMARY DATA ANALYSIS

TABLE 4.5: Environmental Quality Reporting through Primary Data

Panel A Sectors

		Frequency	Valid Percent	Cumulative Percent
Valid	Oil and Gas	35	27.1%	27.1%
	Manufacturing	94	72.9%	100.0%
	Total	129		

Panel B Environmental Quality Reporting Descriptive Statistics

ECONOMIC SECTOR		ECOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Oil & Gas	Mean	164.53	165.52	215.25	132.22	223.76	276.25
	N	32	29	32	18	17	16
	Std. Deviation	39.131	55.907	43.847	34.395	44.687	27.538
	Minimum	90	90	96	80	132	200
	Maximum	240	300	300	180	276	300
	Range	150	210	204	100	144	100
Manufacturing	Mean	186.25	192.00	198.00	116.60	202.52	237.65
	N	84	75	86	94	81	85
	Std. Deviation	45.283	56.449	52.380	46.986	49.126	44.552
	Minimum	90	60	60	20	60	80
	Maximum	300	300	300	200	276	300
	Range	210	240	240	180	216	220
Total	Mean	180.26	184.62	202.68	119.11	206.20	243.76
	N	116	104	118	112	98	101
	Std. Deviation	44.584	57.284	50.616	45.432	48.838	44.516
	Minimum	90	60	60	20	60	80
	Maximum	300	300	300	200	276	300
	Range	210	240	240	180	216	220

4.7 EQR Model 2

In this model the concept of environmental costing and responsiveness are expected to feature. These are responsiveness for Environmental Operating Costs, Environmental Capital Expenditure/Costs, Environmental Technology Content/Costs for production, Environmental Pollution Detection Expenditure/Costs, Environmental Pollution Prevention Expenditure/Costs and Environmental Externality Expenditure/Costs Responsiveness. Table 4.5 shows descriptive statistics of environmental costing responsiveness and reporting for operating expenses (EOPEX), environmental capital expenditure (ECAPEX), and environmental technology content (COTEC). Others are environmental pollution detection (PODET) environmental pollution prevention (POPREV) and environmental externality costs (EEXTC).

4.8 TEST FOR HYPOTHESES 1 AND 2

Hypothesis 1 H_0 Environmental expenditures are not charged independently of other expenditures in the Oil & Gas and Manufacturing sectors.

Hypothesis 2 H_0 The non-application of environmental cost accounting has significantly affected the tracking of externality costs in the Oil & Gas and Manufacturing sectors

Panels A – D of Table 4.6 are paired samples t-test statistics. Panel B paired samples have correlation values ranging from moderate correlation to negative correlation but are all highly significant, $p< 0.05$. Panel D test for paired differences have low standard error means. At 95% confidence interval, apart from EOPEX/ECAPEX, ECAPEX/PROPREV and COTEC/PROPREV that have non significance (2-tailed) paired samples differences, all other environmental costs responsiveness have highly significant paired sample differences. This is

indicative of a rejection of test of paired sample differences meaning an acceptance of the null of Hypothesis 1 (H_0.) which states that: Environmental expenditures are not charged independently of other expenditures. This clearly also is a confirmation of Hypothesis 2 (H_0) that: There is no cost accounting system for tracking of externality costs.

TABLE 4.6: T –Test of Hypothesis

PANEL A Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	EOPEX	183.83	98	44.158	4.461
	ECAPEX	187.04	98	57.279	5.786
Pair 2	EOPEX	180.99	106	43.438	4.219
	COTEC	202.08	106	48.118	4.674
Pair 3	EOPEX	184.65	100	43.625	4.363
	PODET	118.60	100	44.609	4.461
Pair 4	EOPEX	183.62	87	41.990	4.502
	POPREV	209.38	87	47.111	5.051
Pair 5	EOPEX	183.67	90	41.966	4.424
	EEXTC	244.22	90	45.616	4.808
Pair 6	ECAPEX	183.47	95	57.367	5.886
	COTEC	204.76	95	50.634	5.195
Pair 7	ECAPEX	191.25	88	56.504	6.023
	PODET	117.27	88	47.288	5.041
Pair 8	ECAPEX	190.77	78	56.172	6.360
	POPREV	204.31	78	49.382	5.591
Pair 9	ECAPEX	188.35	79	55.803	6.278
	EEXTC	242.78	79	43.880	4.937
Pair 10	COTEC	199.81	103	50.959	5.021
	PODET	119.22	103	43.918	4.327
Pair 11	COTEC	201.49	91	50.928	5.339
	POPREV	207.43	91	47.909	5.022
Pair 12	COTEC	201.35	95	49.853	5.115
	EEXTC	243.37	95	44.497	4.565
Pair 13	PODET	121.43	98	43.577	4.402
	POPREV	206.20	98	48.838	4.933
Pair 14	PODET	120.40	101	43.998	4.378
	EEXTC	243.76	101	44.516	4.430
Pair 15	POPREV	207.91	89	46.256	4.903
	EEXTC	244.72	89	42.961	4.554

PANEL B Paired Samples Correlation

		N	Correlation	Sig.
Paired 1	EOPEX & ECAPEX	98	.664	.000
Paired 2	EOPEX & COTEC	106	-.545	.000

Paired 3 EOPEX & PODET	100	-.531	.000
Paired 4 EOPEX & POPREV	87	-.505	.000
Paired 5 EOPEX & EEXTC	90	-.373	.000
Paired 6 ECAPEX & COTEC	95	-.640	.000
Paired 7 ECAPEX & PODET	88	-.512	.000
Paired 8 ECAPEX & POPREV	78	-.433	.000
Paired 9 ECAPEX & EEXTC	79	-.427	.000
Paired 10 COTEC & PODET	103	.627	.000
Paired 11 COTEC & POPREV	91	.605	.000
Paired 12 COTEC & EEXTC	95	.525	.000
Paired 13 PODET & POPREV	98	.581	.000
Paired 14 PODET & EEXTC	101	.530	.000
Paired 15 POPREV & EEXTC	89	.534	.000

PANEL C Correlations

		EQR	EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Pearson Correlation	EQR	1.000	-.207	-.086	.007	-.046	-.039	-.006
	EOPEX	-.207	1.000	.743	-.556	-.391	-.467	-.359
	ECAPEX	-.086	.743	1.000	-.650	-.542	-.435	-.386
	COTEC	.007	-.556	-.650	1.000	.654	.543	.517
	PODET	-.046	-.391	-.542	.654	1.000	.526	.591
	POPREV	-.039	-.467	-.435	.543	.526	1.000	.600
	EEXTC	-.006	-.359	-.386	.517	.591	.600	1.000
Sig. (1-tailed)	EQR	.	.089	.290	.481	.384	.400	.486
	EOPEX	.089	.	.000	.000	.004	.001	.008
	ECAPEX	.290	.000	.	.000	.000	.002	.005
	COTEC	.481	.000	.000	.	.000	.000	.000
	PODET	.384	.004	.000	.000	.	.000	.000
	POPREV	.400	.001	.002	.000	.000	.	.000
	EEXTC	.486	.008	.005	.000	.000	.000	
N	EQR	44	44	44	44	44	44	44
	EOPEX	44	44	44	44	44	44	44
	ECAPEX	44	44	44	44	44	44	44
	COTEC	44	44	44	44	44	44	44
	PODET	44	44	44	44	44	44	44
	POPREV	44	44	44	44	44	44	44
	EEXTC	44	44	44	44	44	44	44

PANEL D Paired Samples Test

		Paired Differences					t	df	Sig.(2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Paired 1	EOPEX – ECAPEX	-3.21	43.252	4.369	-11.89	5.46	-.736	97	.464
Paired 2	EOPEX - COTEC	-21.08	80.510	7.820	-36.59	-5.58	-2.696	105	.008
Paired 3	EOPEX - PODET	66.05	77.193	7.719	50.73	81.37	8.556	99	.000
Paired 4	EOPEX - POPREV	-25.76	77.338	8.291	-42.24	-.9.28	-3.107	86	.003
Paired 5	EOPEX - EEXTC	-60.56	72.586	7.651	-75.76	-45.35	-7.914	89	.000
Paired 6	ECAPEX – COTEC	-21.28	97.852	10.039	-41.22	-1.35	-2.120	94	.037
Paired 7	ECAPEX - PODET	73.98	90.370	9.633	54.83	93.12	7.679	87	.000
Paired 8	ECAPEX - POPREV	-13.54	89.411	10.124	-33.70	6.62	-1.337	77	.185
Paired 9	ECAPEX - EEXTC	-54.43	84.455	9.502	-73.35	-35.51	-5.728	78	.000
Paired 10	COTEC - PODET	80.58	41.450	4.084	72.48	88.68	19.730	102	.000
Paired 11	COTEC - POPREV	-5.93	44.014	4.614	-15.10	3.23	-1.286	90	.202
Paired 12	COTEC - EEXTC	-42.02	46.196	4.740	-51.43	-32.61	-8.866	94	.000
Paired 13	PODET - POPREV	-84.78	42.560	4.299	-93.31	-76.24	-19.719	97	.000
Paired 14	PODET - EEXTC	-123.37	42.902	4.269	-131.84	-114.90	-28.899	100	.000
Paired 15	POPREV – EEXTC	-36.81	43.158	4.575	-45.90	-27.72	-8.046	88	.000

Model Function Regression

Reference to the EQR Model concept of environmental costing and responsiveness:

EQRM, $Y = f(a, EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC, \varepsilon)$

Where, EQRM (Y) = $a_0 + a_1EOPEX + a_2ECAPEX + a_3COTEC + a_4PODET +$

$a_5POPREV + a_6EEXTC + \varepsilon$

where: a_0 = Constant/Intercept

EOPEX = Environmental Operating Expenditure/Costs Responsiveness

ECAPEX = Environmental Capital Expenditure/Costs Responsiveness

COTEC = Environmental Technology Content for production Responsiveness

PODET = Environmental Pollution Detection Expenditure/Costs Responsiveness

POPREV = Environmental Pollution Prevention Expenditure/Costs Responsiveness

EEXTC = Environmental Externality Expenditure/Costs Responsiveness

ε = Error term

The 'a priori' expectations are:

$a_1 > 0$; implying that the higher the EOPEX, the higher the Y.

$a_2 > 0$; implying that the higher the ECAPEX, the higher the Y.

$a_3 > 0$; implying that the higher the COTEC, the higher the Y.

$a_4 > 0$; implying that the higher the PODET, the higher the Y.

$a_5 > 0$; implying that the higher the POPREV, the higher the Y.

$a_6 > 0$; implying that the higher the EEXTC, the higher the Y

Study of Panel A of Table 4.8 reveals that means of predictors are homogenous. Similarly the standard deviations and means are highest in EEXTC, PODET and POPREV with mean of 241.36 for EEXTC and PODET and POPREV each have mean of 207.27. In Panel B Pearson Correlation, EQR has negative or at best no correlation to EOPEX, ECAPEX, COTEC, PODET, POPREV or EEXTC. However, at significant level (1-tailed), EQR correlation with predictors is at best moderate significance. Whereas, correlation among predictors at sig. (1-tailed) is low, between 0.089 and 0.886, but on the Pearson Correlation scale, they are moderate, between 0.517 and 0.654 for only COTEC, PODET, POPREV and EEXTC.

Table 4.7: Model Summaries of R Squares

Predictor variable	**R Square**	**Adjusted R Square**
EOPEX	.033	.020
ECAPEX	.018	.003
COTEC	.034	.021
All predictor		

independent variables	.077	-.072

Table 4.7 shows model summaries of EOPEX R Square (.033) and Adjusted R Squares (.02), ECAPEX R Square (.018) and Adjusted R Square (.003), and COTEC. R Square (.034) and Adjusted R Square (.021). For all predictor variables together, where R Square is .077, the Adjusted R Square is -0.072. The low value correlation between EQR and predictor factors reveal the present low level state of environmental reporting in the companies in Nigeria. ANOVA reveals F value of 0.516 which is non significant at 0.792, $p>0.05$.

Coefficients are at non significant levels of between 0.06 – 0.852 $p>0.05$, and t values Between -0.647 and 0.263 are:

EQR = 984.811 - 2.589EOPEX + 0.355ECAPEX - .0.300COTEC - .0.425PODET

-.0.795POPREV + 0.235EEXTC + ε

Measurement values from the empirical study do not quite agree with 'a priori' positive expectations. Values from t' statistic are stated as follows:

$a_0 = +984.811 > 0$; $a_1 = -2.589 < 0$; $a_2 = + 0.355 > 0$; $a_3 = - 0.3 < 0$; $a_4 = -0.425 < 0$;

$a_5 = -0.795 < 0$ and $a_6 = + 0.235 > 0$.

Responses of environmental accounting variables in the model from sample companies are evident in empirical values which are low and negative in some cases. Also, beta coefficients of negative values and 0.041 (4.1%) and 0.071 (7.1%) indicate low effect of environmental costing responsiveness. Although, test of multi-collinearity shows agreement and VIF values are acceptable, however, these characteristics are indications that environmental responsiveness and costing is yet to apply in to most companies in Nigeria.

TABLE 4.8: Regressions

PANEL A Descriptive Statistics

	Mean	Std. Deviation	N
EQR	354.07	281.727	129
EOPEX	183.75	39.637	
ECAPEX	186.82	55.981	
COTEC	207.27	47.110	
PODET	120.45	44.719	
POPREV	207.27	49.738	
EEXTC	241.36	48.875	

PANEL B Correlations

		EQR	EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Pearson Correlation	EQR	1.000	-.207	-.086	.007	-.046	-.039	-.006
	EOPEX	-.207	1.000	.743	-.556	-.391	-.467	-.359
	ECAPEX	-.086	.743	1.000	-.650	-.542	-.435	-.386
	COTEC	.007	-.556	-.650	1.000	.654	.543	.517
	PODET	-.046	-.391	-.542	.654	1.000	.526	.591
	POPREV	-.039	-.467	-.435	.543	.526	1.000	.600
	EEXTC	-.006	-.359	-.386	.517	.591	.600	1.000
Sig. (1-tailed)	EQR	.	.089	.290	.481	.384	.400	.486
	EOPEX	.089	.	.000	.000	.004	.001	.008
	ECAPEX	.290	.000	.	.000	.000	.002	.005
	COTEC	.481	.000	.000	.	.000	.000	.000
	PODET	.384	.004	.000	.000	.	.000	.000
	POPREV	.400	.001	.002	.000	.000	.	.000
	EEXTC	.486	.008	.005	.000	.000	.000	
N		129	129	129	129	129	129	129

PANEL C: Model Summary – EOPEX independent variable as predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.182[a]	.033	.020	344.583

Predictors (Constant), EOPEX

PANEL D: Model Summary - ECAPEX independent variable as predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.133[a]	.018	.003	328.537

Predictors (Constant), ECAPEX

PANEL E: Model Summary - COTEC independent variable as predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.184[a]	.034	.021	345.277

a. Predictors (Constant), COTEC

PANEL F: Model Summary - All independent variables as predictors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.278[a]	.077	-.072	291.744

Predictors (Constant), EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC

PANEL G ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	283681.00	6	43946.833	.516	.792[a]
	Residual	3149239.8	37	85114.589		
	Total	3412920.8	43			

Predictors (Constant), EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC

b. Dependent Variable: EQR

PANEL H Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		Std.	Beta				

Model	B	Error		t	Sig.	Tolerance	VIF
Intercept	984.811	511.187		1.927	. .062		
EOPEX	-.2.589	1.753	-.364	-1.477	.148	.410	2.440
ECAPEX	.355	1.352	.071	.263	.794	.346	2.894
COTEC	-.300	1.471	-.050	-.204	.840	.412	2.425
PODET	-.425	1.482	-.067	-.287	.776	.451	2.218
POPREV	-.795	1.228	-.140	-.647	.522	.531	1.884
EEXTC	.235	1.251	.041	.188	.852	.529	1.890

a. Dependent Variable, Environmental Quality Reporting

Panel I Collinearity Diagnostics

Model Dimension	Eigenvalue	Condition Index	Variance Proportions						
			(Intercept)	EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
1	6.676	1.000	.00	.00	.00	.00	.00	.00	.00
2	.223	5.468	.00	.02	.05	.01	.06	.01	.00
3	5.8	12.827	.00	.03	.01	.02	.69	.22	.02
4	41.6	16.625	.02	.02	.07	.44	.12	.25	.04
5	66.5	20.025	.00	.00	.02	.02	.07	.38	.89
6	31.2	22.557	.00	.64	.81	.13	.03	.10	.00
7	758	34.050	.97	.29	.04	.39	.04	.05	.05

a. Dependent Variable: Environmental Quality Reporting

4.9 **RESPONSE TO QUESTIONNAIRE AND INTERVIEW WITH ENVIRONMENTAL POLICY REGULATORS**

Public Agencies that participate in regulating environmental policies some of which were interviewed are the Federal Ministry of Environment, Lagos State Ministry of Environment (LASEPA), Department of Petroleum Resources (DPR) and the National Environment Standards Regulations and Enforcement Agency (NESREA). Other agencies are the Ogun State Ministry of Environment, Bayelsa State Ministry of Environment, Lagos State Waste Management Authority (LAWMA) and Lagos State Housing and Urban Development Authority Responsible officials who responded to questionnaire/interview instrument were Director of Ministry of Environment, Assistant Director of Ministry of Environment,

and Chief Environment Scientific Officer. Others are Mid Career Officer of Environment, Senior Scientific Officer of Environment, Head of Research and Development of Environment, Chief Environmental Scientist and Principal Environmental Scientist of Environment.

Issues clarified are enumerated:

1. The Department of Petroleum Resources (DPR) which is responsible for the Oil and Gas Sector requires the project operator corporate organizations to demonstrate that due considerations are given to compliance with relevant legal requirement. Whereas the responsibility for the oil and gas sector is clearly assigned to the DPR, other regulatory agencies only sometimes carry out this requirement in the manufacturing sub-sectors.

2. Regulatory agencies require to a high degree that there be words of disclosure on environmental issues including energy conservation in environmental reports of operators.

3. It is a requirement to undertake site inspection of all applicant/operator organizations' projects in order to record and check the effectiveness of site management and to identify any required action. This is a requirement for new projects and occasional inspections for existing projects

4. Regulatory Agencies require operator organizations to remit reports on annual or other regular basis. Environmental Impact Assessments (EIAs) are required before project take off, and Annual Environmental Audits are carried out. Environmental reports required by the DPR and Federal Ministry of Environment are:

Environmental Monitoring Reports on effluents, waste treatment and disposal, monthly

Environmental Management Plan

Environmental Studies

Environmental Audit Reports

5. In permanent cessation of project, DPR requires operators to ensure that they address all residual environmental issues associated with the operation. This is not necessarily the case in other manufacturing sectors.

6. Regulatory Agencies however require that project operators address issues relating to future pollution on the abandonment of the project.

7. Regulatory Agencies require that suitably qualified consultants are appointed to undertake an Environmental Impact Assessment (EIA) associated with particular project which are then communicated to the Agency responsible for regulation.

8. Regulatory Agencies are expected to regulate project operators on choice of technology and impact on the environment.

9. Regulatory Agencies do regulate project operators on implementation of projects and ensure compliance of operators to any environmental legislation.

10. On Procurement Services, Regulatory Agencies do ensure that operators have in place Environmental Policy Statements which are also meant to affect prospective contractors and invitation to tender procurements. They also ensure that the operators ensure that their personnel and contractors maintain full awareness of relevant elements of the operators Environmental Policy Documentation.

11. On Waste Management, the DPR for the Oil and Gas Sector ensure that controlled waste are transported only by carrier registered under the Control of Pollution (Amendment) Act 1989, but not so for other manufacturing sector through LASEPA or other Regulatory Agencies. The Regulatory Agencies however, ensures that controlled wastes are only disposed of to site licensed under the 1990 Environmental Protection Act.

12. On Pollution Prevention, DPR is able to continue to reduce the impact of crude oil on the environment and seek to prevent any new significant pollution. They are also able to maintain a programme for monitoring crude oil spillage at surface and below water in offshore

13. Regulatory Agencies in Nigeria are of the opinion that the oil sector in Nigeria is reasonably pursuing environment degradation and pollution prevention.

4.10 NVIRONMENTAL PERFORMANCE REPORTS IN SOME COMPANIES IN NIGERIA

SHELL NIGERIA ANNUAL REPORT AND ACCOUNTS
2006 Annual Report & Accounts
Statutory Compliance

"In 2003, we agreed to a compliance plan with the Department of Petroleum Resources (DPR) for Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN). Over the years we have worked to conform with these standards and by 2005 we have achieved 92 per cent compliance"

"Environmental Sensitivity Index (ESI) Protocol: An ESI mapping protocol has been submitted to the DPR for approval. It will provide a framework to improve crisis management and preparedness for oil spills."

Shell 2005 Annual Report & Acounts

Environmental Spending

	(US $ million)
Environmental Affairs	4.5
Spill response equipment, Waste management, Pollution	17.8
Associated gas gathering	338.8
Flow line replacement and maintenance	9.5
Flow station upgraded, bunkwall, smokeless flares.	3.0

Jetty shoreline – protection	1.9
Pipeline Replacement and maintenance	99.4
Terminal upgrades	316.1
Total	**791**

SHELL 2004 ANNUAL REPORTS & ACCOUNTS

As part of notes to the accounts, environmental report is stated as follows:

Environmental expenditure:

> Environmental expenditures relating to current operations are expensed or are capitalized where such expenditures provide future economic benefits. Liabilities for environmental remediation resulting from past operations or events are recognized in the period in which an obligation to a third party arises and the amount can be reasonably estimated. Measurement of liabilities is based on current legal requirements and existing technology. Liabilities are determined independently of expected recoveries third parties. Such recoveries are recognized and reported as separate events and brought to account when reasonably certain of realization. The carrying amount of liabilities is regularly reviewed and adjusted as appropriate for new facts or changes in law or technology.

Shell Financial Quantities in Annual Report:

	2004 (N million)	**2003 (N million)**
Environmental clean-up	1,966.6	2,045.4

Environmental clean-up details:

	2004 (N million)	2003 (N million)
Balance at January 1	2,045.4	3,655.0
Charge for the year	0	(1,799.3)
Translation difference	(78.7)	189.7
Balance	1,966.6	2,045.4

Environmental Policy

This policy statement serves to demonstrate our responsibility to the environment and the pursuit of our world-class vision in all aspects of our operations. We will strive to comply with all current and future environmental laws and regulations, and continuously improve the efficiency of our operations to minimize impact on the environment.

In order to meet this commitment we are guided by the following principles:

- Compliance with relevant States and Federal laws and regulations.
- Use of available technology and knowledge to prevent or continue to reduce pollution and seek savings water and energy in a cost effective manner.
- Development of cost effective strategies to ensure that residues / by-products generated in our operations are collected and processed in a manner suitable for recycling and / or disposal with the least possible impact on the environment.
- Assessment of environmental impact of new products, processes and major projects before development.

- Encouragement of necessary awareness among our employees on issues of the environment. This is to engender active involvement in maintaining a clean and tidy working environment and to act in an environmentally responsible way.
- Promotion of environmental sustainability by regular dialogue with immediate communities and regulating authorities on how to improve an environmental care.
- Publication of this policy, environmental objectives and targets in our annual environmental report.
- The actual implementation of this policy rests with branches of the company with support of all employees. However, it is management's responsibility to ensure that it is understood and applied by employees at all levels of the Company.

There are however, no reported Environmental Expenditures or Environmental Liabilities in the Annual Report of the Nigerian Breweries for the year.

ETERNA OIL & GAS PLC 2006 ANNUAL REPORT AND ACCOUNTS

HSSE Policy

In order to create a sustainable business that will compete on global scale and meet expectations of our international partners, we have enshrined HSSE Policies that are benchmarked to Global standard. We observe strict HSSE philosophy and mandate it on all personnel of the company as well as third parties working with the company. We have zero tolerance for HSSE defects in our operations and business environments to safeguard our employees, customers and thirds party employees.

To minimize the damage to the environment through our activities, we have laid down strict environmental policy in the way and manner we carry out our businesses. These are embodied in our designs for plants and petrol stations. New technologies are being adopted and

introduced into our facilities to enhance security, prevent fire, leakages, spillage and vapourization of fuel products. We are also continuously exploring modern and more effective waste disposal methods from our plants and stations. There are also, no reported Environmental Expenses or Environmental Liabilities.

Reporting in most companies

Reporting in most Nigerian companies are on Employees Health, Safety and Environment and these reports centre on safety workplace and hazard prevention for employees, and their health. There is little or no environmental content in disclosure report

4.11 BASES AND DESIGN OF ENVIRONMENTAL COST ACCOUNTING

Since conventional approaches of costing have become inadequate, Environmental Management Accounting (EMA) has proved beneficial. Three broad benefits of EMA (German Environmental Ministry: 2003, IFAC 2005) are emphasis on environmental law regulation compliance, eco-efficiency and strategic positioning of organizations. EMA advocates for environmental protection through cost efficient compliance with environmental regulations and self-imposed environmental policies. Examples are in planning and implementing pollution control investments or capital projects. It also involves investigating and purchasing cost efficient substitutes for environmentally degrading activities and the reporting of environmental wastes and emissions to regulatory agencies. EMA advocates for simultaneous reduction of costs and environmental impacts through more efficient use of water and materials

in internal operations. On Strategic Planning, EMA advocates for the evaluation and implementation of cost-effective and environmentally sensitive programmes to ensure organizations' long-term strategic position.

For purpose of design of Environmental Accounting, Costs identification, classifications and management are suggested alongside proposition concepts of the Global Environmental Management Initiative (GEMI, 1994) and the US EPA (1995). According to GEMI, environmental cost managements may be recognized through Environmental Cost Primer Model in which Cost Boundaries are identified as in Figure 2.1. Here, costs identification and management comprise of conventional costs such as off-site waste disposal, purchase and maintenance of air emission control systems, utilities costs and perhaps costs associated with permitting of air or wastewater discharges. Another compartment comprise of wide-range of costs (also of savings and revenues) such as: liability, future regulatory compliance, enhanced position in green product markets, and the economic consequences of changes in corporate image linked to environmental performance.

There is a category for company's Internal Costs called Private Costs for which the company is held responsible. There is also a category for External Costs also called Externalities or Societal Costs comprising costs such as costs incurred on adverse health effects for air emissions, damage to buildings or crops resulting from SO_2 and irreversible damage to the ecosystem. Environmental Externalities costs are those which the company is not held accountable, but the organizations should take responsibility for.

The US EPA (1995) also suggests the recognition, costs categorizations and management in broad categories of Private Hidden Costs such as Regulatory, Upfront and Voluntary costs. Other categories are Conventional Back-End costs, Contingent Costs, and

Image and Relationship Costs. Figure 2.1 in this study shows greater details under this environmental costs management concept. The gathering and categorizations of environmental costs information in organizations will meaningfully require the inputs of the environmentalists, legal, operations, facility management and cost accounting specialists (Enahoro: 2004:557)

4.12 ENVIRONMENTAL FINANCIAL STATEMENTS (EFS) MODEL

Tables 4.9 – 4.11 reveal the concepts of Environmental Financial Statement Model which constitute two basic Financial Models. EFS model is drawn from the concepts of Howes (2002:28-33), and consists of Programme Environmental Financial Statement, and Consolidated Externality Environmental Cost Accounts. It is the considered view of this study that this approach is capable of giving a completely new dimension of reporting of financial statements. The new dimension will not only benefit the general public users of financial statements, but also for enhanced internal management efficiency. The methodology would make a significant attempt in addressing the issue of capturing impact on the environment in financial reporting considering the need for environmental costing responsiveness and according to Osisioma and Enahoro (2006:5), it is imperative to develop and sustain total quality in accounting reporting to assure accuracy void of misstatement, which is critical to assure objectivity and credibility in financial statements.

Pro-formal is a representation of Programme Environmental Financial Statement. This Statement shows programme/project costs associated with environmental costs charged independent of normal cost accounting system. Costs of basic programme / project comprise of environmental costs for quality environmental consumables (EOPEX), costs of operating

pollution control equipment (POPREV), costs incurred for treating and dispensing of toxic wastes and maintaining pollution prevention equipment (POPREV), waste minimization and pollution prevention equipment depreciation (POPREV). Others are costs of recycling scraps and costs (inclusive of peculiar military installations in the Niger Delta oil sector (ECAPEX), security costs, mob agitation, government paid ransom costs on hostages, etc (EEXTC).

Yet other critical costs to be accounted for in environmental reporting are remediation, waste and other costs such as personal or group injury/compensation claims, waste disposal costs, costs for cleaning up polluted natural lands, water bodies, and environment, remediation/clean-up costs (all EEXTC) and cost of audit of environmental activities (EOPEX). Others are remediation costs such as fines and prosecutions, waste disposal costs, environmental taxes e.g. for landfill and climate levy (as costs may be rightly classified). Also environmental savings such as income, savings and cost avoidance for the year will have to be recognized.

Consolidated Externality Environmental Costs Accounts as depicted in Table 5.3 and Table 4.12 entail impact of emissions into the air, effluents on land and into water. Emission Impacts for direct energy, natural gas consumption, CO_2, NO_X, SO_2 and electricity consumption are measured in tons, unit costs, and costs to deliver relevant sustainable targets. These impact measurements are factored into corporate bottom-line statements of Environmentally Sustainable Adjusted Profits. These approaches are not without difficulties as the methodology of valuation of environmental factors is a major challenge.

TABLE 4.9: Environmental Financial Statement (EFS) Model

	2008	**2007**

	N	N
Environmental costs		
Costs of basic programme	X	X
Quality environmental consumables	X	X
Costs of operating pollution control equipment	X	X
Costs incurred for treating and dispensing of toxic wastes	X	X
Maintaining pollution prevention equipment	X	X
Waste minimization and pollution prevention equipment depreciation	X	X
Costs of recycling scraps	X	X
Other costs (inclusive of peculiar military installations in the Nigeria Niger Delta oil sector, mob agitation security costs, Government paid ransom costs on hostages, etc)	X	X
Total cost of basic programme	**X**	**X**
Remediation, waste and other costs		
Personal or group injury/compensation claims	X	X
Waste disposal costs	X	X
Costs for cleaning up polluted natural lands, water bodies, and environment	X	X
Remediation/clean-up costs	X	X
Cost of Audit of environmental activities	X	X
Other costs, etc	X	X
Total remediation, waste and other costs	**X**	**X**
Environmental savings		
Income, savings and cost avoidance in report year	X	X
Reduced insurance from avoidance of hazardous materials	X	X
Reduced landfill tax and other waste disposal costs	X	X
Energy conservation savings	X	X
Waste conservation savings	X	X
Reduced packaging savings	X	X
Income from sale of recovered and recycled materials	X	X
Other savings, etc	X	X

Total environmental savings	**X**	**X**
As a percentage of environmental costs	*X*	*X*
Summary of Savings		
Savings in report year	X	X
Savings brought forward from initiatives in prior years	X	X
Total income, savings and cost avoidance	**X**	**X**

Source: Researcher's Work (2008), adapted from Howes, R. (2002:28): Environmental Cost Accounting: An Introduction and Practical Guide, CIMA

TABLE 4.10: Environmental Financial Statement (EFS) adjusted profit and loss (highlighted) for three accounting years ending March 31, 2008, 2007 and 2006

	2008	2007	2006
	Nm	Nm	Nm
Turnover	X	X	X
Sustainable cost of operation	X	X	X
Total other operating costs (as reported)	X	X	X
Revised operating profit	X	X	X
Revised profit on ordinary Activities after taxation	X	X	X
Dividends	X	X	X
Revised movement in reserves	X	X	X
Impact on profits (compared to post-tax profits as originally reported)	X	X	X

Source: Researcher's Work (2008); adapted from Howes, R. (2002:28): Environmental Cost Accounting: An Introduction and Practical Guide, CIMA

Table 4.11: Pro-forma consolidated external environmental cost accounts for A Company PLC for the period 30 April 2008

Emissions/Impacts (selected account headings)	**Emissions (Tonnes)**	**Unit Cost (N) (where relevant)**	**N000's 'to deliver the**

			relevant sustainable targets'
Impacts to air			
Direct energy			
Natural gas consumption kwhs	Avoidance and	Restoration costs	
CO_2	X	X	
NO_X, SO_2	X	X	
Total			X
Electricity consumption kwh			
CO_2	X	X	
NO_X, SO_2	X	X	
Total (avoidance)			X
Production-related emissions			
VOCs	X	X	
NO_X, SO_2, etc	X	X	X
Transport			
Company cars, kms			
CO_2	X	X	
NO_X, HCs and particulates	X	X	
Total company cars			X
Freight/distribution and contractors, kms			
CO_2	X	X	
NO_X, HCs and particulates	X	X	
Total distribution			X
Air miles/aviation			
Impacts to air (continued)			
CO_2	X	X	
NO_X	X	X	
Impacts to land			
Waste disposal to landfill	X	X	X
Contaminated land (restoration)			X
Impacts to water			
Abstractions at vulnerable sites			X
Total sustainability cost			X
Profit after tax per the financial accounts			
Environmentally-sustainable /adjusted profit			X

Source: Researcher's Work (2008); adapted from Howes, R. (2002:30-31): Environmental Cost Accounting: An Introduction and Practical Guide, CIMA

Table 4.12: Pro-forma external environmental cost accounts for the year to 31 March 2008

Emissions/impacts	**Emissions (Tonnes)**	**Reduction Target (Tonnes) (sustainability gap)**	**Unit cost(N) (where relevant)**	**N000s to deliver the targets**
Impacts to air				
Direct energy Electrical consumption kwh CO_2	X	X	-	
NO_X	X	X	-	
SO_2	X	X	-	
Total (avoidance)				X
Natural gas consumption Kwhs (CO_2 only)	X	X	X	X
Diesel Oil–kwhs litres CO_2 only	X	X	X	X
Production-related emissions Metane (CH_4) Emissions from wastewater Treatment	X (Expressed as CO_2 equivalent	X	X	X
TransportCompany cars (petro and diesel) kms				
CO_2	X	X	X	X
NO_X, HC_S and particulates	1	< 1	X	X
Commercial vehicles (petrol and diesel) kms				
CO_2	X	X	X	X
NO_X, HC_S and PM	X	X	X	X
Contractors, kms				
CO_2	X	X	X	X
NO_X, HC_S and PM	X	X	X	X
Contaminated land (restoration of sacrificial and dedicated land)			X	X
Impact to water				
Abstraction at vulnerable sites–provision of alternative supplies				X

Total sustainability cost				X
Profit after tax per the financial Accounts				X
Environmentally sustainable /adjusted profit				X

Source: Researcher's Work (2008); adapted from Howes, R. (2002:32-33): Environmental Cost Accounting: An Introduction and Practical Guide, CIMA

4.13 REPORTING OF FINANCIAL STATEMENTS TO EXTERNAL PUBLIC AND ACCOUNTING INFORMATION USERS

According to Leckiss (1991:6), 'We must measure up to the environmental challenge if we are to fulfill our duty as a profession to promote the public interest. We forget at our peril that we do not own our natural assets, we merely hold them in trust for future generations.' Gray and Bebbington (2001:221), reveals that 'why accounting is so closely implicated in the environmental crisis is that a company, an industry, an economy can be showing very positive 'success' indicators in the form of profits and growth whilst, simultaneously, polluting the air and the sea, laying off staff, destroying habitats, and disrupting communities.' This phenomenon is the least expected for eco-efficient sustainability. Organizations increasingly face the reality of waste disposal costs, increases in the costs of plant to accommodate environmental improvements and increased costs to meet requirements of Environmental Management Systems (EMS), Gray and Bebbington provides some environmental costs measurements such as in Figure 5.1

4.14 THE UNITED STATES SUPERFUND

In 1980, the United States issued the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and ushered in a new era of environmental management with very specific accounting implications.

CERCLA was designed to force 'responsible parties' to clean up land contaminated through dumping, waste storage, leakages, etc. To enable this to happen where the 'responsible party' was unable to find the costs of clean up (remediation), CERCLA established a 'superfund'- 88 per cent of which came from industry – to pay for the process (hence the more common reference to this Act and similar proposals as 'Superfund').' ….

'The accounting issues that arise from Superfund are fairly direct and cover the making of provisions for remediation, contingent liabilities and how to account for a fixed asset which suddenly acquires a negative value.

Gray and Bebbington (2001:224-225)

Table 4.13: Costs of Environmental Measures

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1. Expenditure aimed at preventing, reducing or recycling effluents/ emission wastes
2. Costs of producing more environmentally friendly products.
3. Costs charged under Polluter Pays Principles
4. Costs incurred in restoration or remediation of water, soil or land cursed by normal operating activity of organization or past activities at a site.
5. Clean up of pollution as a result of an accident
6. Costs incurred in Research and Development, assignments and impact statement preparations and site investigations and assessments.
7. Costs incurred in environmental administration such as policy development, management structures, information systems and environmental audits.
8. Costs incurred to assist resource recycling, re-use, substitution or increasing the efficiency of resource use.
9. Costs incurred to recycle, re-use or reduce waste production.

10. Costs incurred in support of wildlife conservation, replanting forests or restocking fish supplies.

Environmental Losses

1. Fines, penalties and damages arising from non-compliance with environmental laws or consents

2, Costs incurred where facilities have been shut down due to environmental concerns.

3. Assets of the entity which cannot be recovered due to environmental concerns.

Source: Adapted from CICA (1993:9-11; Gray, R and Bebbington, J; 2001:224): Accounting for the Environment, Second Edition, London; Sage Publications

Table 4.14: Recommendations for Environmental Reporting from the UN CTC ISAR'S 9th Session in the Director's Report:

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1. Environmental Issues pertinent to the company and industry

2. Environmental Policy adopted

3. Improvements made since adopting the policy

4. Entreprises environmental emission targets and performance against these

5. Response to government regulation

6. Material environmental legal issues in which the entreprise is involved

7. Effect of environmental protection measures on capital investment and earnings

8. Material costs charged to current operations

9. Material amounts capitalized in the period

In the notes to the Financial Statements:

1. The accounting policies for recording liabilities and provisions, for setting up catastrophe reserves and for disclosing contingent liabilities

2. Amount of liabilities, provisions and reserves established in the period

3. Amount of the contingent liabilities

4. Tax effects

5. Government grants received in the period

* United Nations Centre for Transnational Corporations Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (UN CTC ISAR)

Source: Adapted from CICA (1993:9-11; Gray, R and Bebbington, J; 2001:224): Accounting for the Environment, Second Edition, London; Sage Publications

Table 4.15: UN ISAR Accounting Guideline – Environmental Financial Accounting Recognition of Environmental Costs

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1. Environmental costs relating to damage should be recognized immediately and charged to income

2. Environmental costs should only be capitalized if they meet specific criteria (provided in draft)

3. Future site restoration costs should be accrued and capitalized as the damage is incurred

4. Environmental costs which are part of an asset should be included with that asset

5. Environmental costs that do not meet the asset recognition should be expensed immediately

Recognition of Environmental Liabilities

1. An environmental liability should be recognized when the entreprise is obliged to incur an environmental cost and cannot avoid that cost

2. Environmental damage–even when there is no immediate duty to remediate–should be disclosed in the notes to the accounts

3. Costs relating to remediation or removal of long-lived assets should be recognized as a liability at the time of the damage

Recognition of recoveries

1. Recovery expected from a third party should not be netted off but separately recorded

2. Expected sale of property should not be netted off against an environmental liability

Measurement

1. Best practice should be used to estimate liabilities and where this is not possible this must be explained in the notes to the accounts

2. Net Present Value may be used to estimate certain liabilities and this should be disclosed

Disclosure

The Entreprise should separately disclose:

- Its category of environmental costs
- Environmental costs charged to income
- Fines and penalties
- Environmental liabilities with accompanying detail

Source: Adapted from UN ISAR Accounting Guideline – Environmental Financial Accounting Draft, July 1997; Gray, R and Bebbington, J; 2001:229): Accounting for the Environment, Second Edition, London; Sage Publications

Table 4.16: Environmental Costs relating to current accounting period

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Costs of environmental measures that relate directly to benefits received in the current period and that should be charged to it include treatment of waste products, costs of hazardous waste disposal; clean up costs related to current operating activities

Costs related indirectly to current period benefits

Environmental costs that bear only an indirect relationship to benefits of the current period including on-going environmental administration, compliance assessment and audit activities, and employees attendance at study groups and seminars on environmental issues.

Costs viewed as period costs or losses

Many environmental costs incurred will simply be viewed as 'period' costs or losses. These include:

1. Costs that do not have sufficient ties to future benefits and therefore cannot be capitalized or deferred. Examples are research cost for the redesign of product s and processes to (i) prevent and abate damage to the environment, or (ii) conserve non-renewable and renewable resources; donations to programmes related to the environment; and recycling programmes.
2. Costs that are related to the activities of, and benefits received in, prior periods, but that do not qualify as prior period adjustments. Examples are clean up of a polluted site that has been abandoned; decisions to clean up was made by management; clean up costs related to prior period activities in excess of the estimates recorded in prior periods (benefits received in those prior periods); clean up of a non-owned sites previously used, the clean up being required as the result of new laws or regulations.
3. Costs that do not yield any benefits that are losses.
4. Fines or penalties for current non-compliance related to operating activities.

Source: Adapted from CICA (1993:20); Gray, R and Bebbington, J; 2001:230): Accounting for the Environment, Second Edition, London; Sage Publications

CHAPTER FIVE

DISCUSSIONS OF FINDINGS, POLICY RECOMMENDATIONS AND CONCLUSIONS

5.1 OVERVIEW OF THE STUDY OBJECTIVES

A recap of the objectives of the study is to:

i. Assess level of existence or non-existence, appropriateness and efficiency of environmental costs and disclosure reporting, whether of current or capital expenditure.

ii. Assess level of independence of tracking of all costs impacting on the environment whether current or capital expenditure.

iii. Evolve and provide conceptual bases for cost and management accounting and disclosure in financial reporting of both environmental financial and non-financial information.

iv. Design bases for environmental cost accounting for corporate organizations and disclosure in corporate financial statement which will facilitate efficient valuation of degradation in affected communities. It is also intended that this study will evaluate the challenges and prospects facing organizations with regard to designing environmental accounting concepts, reporting and disclosure.

The double Research Instruments approach through Primary Questionnaires and Secondary data corporate Annual Reports & Financial Statements is well intentioned. Results which are gathered through both research instruments are meant to be corroborative. As remarked in the study, Annual Reports and Financial Statements are valid and accepted official reporting of statutory organizations. Annual Reports and Financial Statements of corporate organizations reveal the reality state of reporting of activities to the public. Consequently,

environmental cost responsiveness, accounting reporting and disclosure of environmental activities will be evidently revealed or otherwise.

It is understandable that there are other sources of information apart from through Annual Reports and Financial Statements. This is particularly important where Annual Reports proves inadequate. For instance, certain qualitative information are available through questionnaires and through honest response to interview carried out to target group. Hence, we have sought a combination of data from both primary and secondary sources. These have well paid off and are reported in this study.

5.2 DISCUSSION OF FINDINGS

Appendix 8 shows list of sample companies and latest Annual Financial Statements and Report years which were verified. Sample size was 132 companies drawn from an estimated population of 59,500 (effective population of 215 companies listed and quoted in the Nigeria Stock Exchange Market). The 132 sample companies are those in Oil & Gas and Manufacturing Sectors. The Manufacturing companies further comprise of those in Agriculture, Automobile & Tyre, Breweries, Building Materials, Chemical and Paints. Others are Conglomerates companies, Food/Beverages & Tobacco, Footwear, Healthcare, Industrial/Domestic Products, Packaging, Printing & Publishing, and Textiles. Added to the list of manufacturing are Foreign-listed Oil & Gas companies and other Emerging Markets known as Second-Tier Securities companies in the Nigeria Stock Market. Evident in the study are:

1. Extent of Disclosure of environmental reporting in the context of mere indicative content or descriptive content improved status, or quantitative and monetary content which is most qualitative. In this respect, means of overall of environmental disclosure are quantitative

content 1,185.88, descriptive content 1,012.09, and mere indicative content 92.92. Standard deviation is highest for descriptive content 1,485.863, quantitative content 1,173.374 and indicative content of 75.691.

2. The study further reveals means of environmental reporting of 933.55 and 693.94 for the manufacturing and the oil and gas sectors respectively. The oil and gas however have highest environmental reporting quality of maximum of 8,150 as against 5,100 for the manufacturing sector. Standard deviation is highest for descriptive content 1,485.863, quantitative content 1,173.374 and indicative content of 75.691. The companies of highest environmental quality and quantitative content reporting and disclosures are Shell Petroleum Development Company (SPDC) and Exxon Mobil. These are foreign listing oil and gas upstream sub-sector companies operating in Nigeria. Next to the foreign listing oil and gas sub-sector in quality reporting by reason of qualitative content is the food and beverages and health care sub-sectors. The dominating companies in this high category of environmental reporting and disclosure are Nestle Nigeria Plc of the food and beverages sub-sector and GlaxoSmithkline Consumer Nigeria Plc of the health care sub-sector. There are lowest reporting of 25 and 26 for the oil and gas and the manufacturing sectors respectively.

3. Environmental accounting disclosure does not take the same pattern among companies in Nigeria. Study shows a high significance of the non-equality of the between groups and within groups of sectors environmental reporting and disclosure. The high significance of the mean differentials, Sig. 0.001, $p<0.05$ is an indication of a confirmation that environmental accounting disclosure does not take the same pattern among companies in Nigeria. Within the same sub-sectors, while some companies have high level of Environmental Quality Reporting (EQR), others EQR is low.

In Panel C, R-Square and Adjusted R-Square predictor variable of PAT are 0.017 and 0.01 respectively, while R square and Adjusted R Square in Panel D showing all predictor variables are 0.03 and 0.008. Panel E reveals F value of 1.334, at Sig. 0.259, p>0.05. This is non-significant. Low Beta values of predictors are indications of low level of environment cost responsiveness, reporting and disclosure in most companies in Nigeria. Therefore, environmental accounting practice does not impact on company performance in Nigeria.

4. We are not able to ascertain response of Environmental Reporting on TUR, PAT, CNA and EPS because Environmental Reporting is barely disclosed in most companies. Besides, Environmental Policy Statements and performance, which are reported in a few companies such as in Guinness, Dunlop and Ashaka Cement are scarcely read by most Financial Statement users. Where these are read at all, contents are barely imbibed and their significance not appreciated. The level of awareness of the Financial Statement users and the general public for corporate responsibility for environmental accounting is very low. Consequently, reporting on environment or otherwise scarcely have effect on corporate performance with regard to TUR, PAT, C NA and EPS

5. Study of environmental cost responsiveness and reporting for operating expenses (EOPEX), environmental capital expenditure (ECAPEX), environmental technology content (COTEC) and others which are environmental pollution detection (PODET) environmental pollution prevention (POPREV) and environmental externality (EEXTC) shows that environmental expenditures are not charged independent of other expenditures. There is also no cost accounting system for tracking of externality costs. Correlation among predictors at significant level (1-tailed) is low, between 0.001 and 0.486, but on the Pearson Correlation scale, they are moderate, between 0.517 and 0.654 for only COTEC, PODET, POPREV and EEXTC.

Table 4.7 shows model summaries of EOPEX R Square (.033) and Adjusted R Squares (.02), ECAPEX R Square (.08) and Adjusted R Square (.003), and COTEC. R Square (.034) and Adjusted R Square (.021). For all predictor variables together, where R Square is .077, the Adjusted R Square is -0.072. The low value correlation between EQR and predictor factors reveal the present low level state of environmental reporting in most companies in the oil & gas and manufacturing sectors in Nigeria. ANOVA reveals F value of 0.516 which is non significant at 0.792, $p>0.05$. Coefficients are at non significant levels of between 0.06 – 0.852, i.e. $p>0.05$ and t values between 1.477 and 0.188 are:

EQR = 984.811 - 2.589EOPEX + 0.355ECAPEX - 0.300COTEC - 0.425PODET

- 0.795POPREV + 0.235EEXTC + ε

Beta coefficients of negative values and 0.041 (4.1%) and 0.071 (7.1%) indicate low effect of environmental consciousness. This is an indication that environmental responsiveness and costing is yet to apply in most companies in Nigeria with the exemption of the foreign listing multinational companies indicated in the study.

6. Responses of environmental accounting variables in the model from sample companies are evident in empirical values which are low and negative in some cases. Also, beta coefficients of negative values and 0.041 (4.1%) and 0.071 (7.1%) indicate low effect of environmental costing responsiveness.

7. Reporting in most Nigerian companies are on Employees Health, Safety and Environment and these reports centre on safety workplace and hazard prevention for employees, with focus on employee health. There is little or no focus on environmental issues, activities or the prevention of degradation on the environment. There are also, no policy statements to prevent or alleviate these occurrences.

8. Nigerian SAS 23 on Provisions, Contingent Liabilities and Contingent Assets became effective in 2006. This does not specifically provide for environmental issues and reporting. There are no accounting standards in Nigeria which recognize carbon allowances and trading as it is in the IAS 38. The IAS 38 recognizes carbon allowances as contingent assets and therefore disclosed in notes to financial statements. Carbon Trading and market have not commenced in Nigeria. In the oil & gas sector, for instance, there is still unrestricted gas flaring and carbon dioxide emission into the air in the manufacturing sector.

9. On disclosure of environmental issues in financial reports, it is suspected that there is much guesses by employees of Environmental Regulatory Agencies. This is likely the case when what is expected or what actually obtains with regards to statutory reporting are not certain. The positive responses do not correspond to evidence on Annual Reporting. There may however be other forms of reporting which are statutorily required to be provided from the operators.

10. Responses show that Environmental Impact Assessments (EIAs) are carried out on projects which are expected to have impact on environment.

11. Positive responses are high in the monitoring process. The Federal Ministry of Environment (FMEnv.) and the Lagos State Environmental Protection Agency (LASEPA) are particularly noted for engaging actively in environmental monitoring. The Department of Petroleum Resources (DPR) also actively regulates the oil & gas sector.

5.3 POLICY RECOMMENDATIONS

1. Corporate organizations whose operations impact on environment should develop Plans and Operating Guidelines as Internal Corporate Standards which are expected to meet Industry

Operating Standards. Corporate Plans and Operating Guidelines should focus on minimizing impact on environment. Consequently, environmental compliance audit and inspection programme of corporate operating facilities should be put in place. There should be continued evaluation of new technologies to reduce environmental impacts.

2. Standard definitions should be agreed for environmental spending and expenditure for purpose of annual reports' environmental accounting in the manufacturing, Oil & Gas sectors operating in Nigeria. The adoption of the United Nations Environmental Management Accounting (EMA) Guidelines will enable for the formulation of a Generally Accepted Accounting Principle (GAAP) in Nigeria which will evolve environmental accounting practice. This will not only move forward Environmental Accounting practice in Nigeria but enable for joining global campaign for environmentally enhanced society.

3. Whereas statutory disclosure of environmental information is fast becoming the practice in the developed nations, the Federal Ministry of Environment, the Department of Petroleum Resources and other regulatory agencies in Nigeria, should formulate statutory requirements for corporations to adhere to. This will facilitate environmental accounting responsiveness and general corporate social responsibility to enhance society and environment.

4. Nigeria Accounting Standards Board (NASB) and the Institute of Chartered Accountants of Nigeria should accommodate the growing awareness in environmental accounting and formulate disclosure requirements. Bases and design for environmental accounting and management as emphasized in this study should be considered.

5. Both SEC and accounting practice in Nigeria should consider the urgency of placing demand on corporate organizations which impact on environment environmental disclosure requirement. Companies considered as polluters registered on the Stock Exchange Market

should provide information about the costs incurred to conform to environmental legislations. Other companies not in that category who have it as voluntary requirement should be encouraged on environmental disclosure.

6. Since Nigeria has assented to the Kyoto Protocol, there is need for Nigeria accounting practice to promulgate relevant standards to incorporate environmental issues in financial reporting. This is in line with International Accounting Standard 38 and global trend. This is the development in the EU Communities, Canada, the USA, Norway, Zimbabwe, Namibia, The Philippines and Indonesia, among others.

5.4 CONCLUSIONS

We are able to conclude from study that environmental expenditures are not charged independently of other expenditures; there is no cost accounting system for tracking of externality costs; and that environmental accounting practice does not impact on company performance in Nigeria. We are also able to conclude that Environmental accounting disclosure does not take the same pattern among companies in Nigeria. Low Adjusted R Square level of 0.008 (0.8%) and low Beta values of predictors which are indications of current low level of environment reporting and disclosure in most companies in Nigeria, reveal that environmental costing system is not significant for purpose of internal decision in Nigerian companies currently. Therefore, environmental accounting practice does not impact on company performance in Nigeria. However, a significant size of the upstream sector (not downstream) of the oil and gas sector integrate environmental cost consideration in capital projects and investments in the companies. This is also noted in a few multinational companies engaged in manufacturing.

Two main internal barriers which affect the ability of the company to collect environmental cost information are the absence of classification of costs on environmental bases. Skills in the principles and practice of environmental cost and management accounting have not yet attained prescribed standards in Nigeria. However, suggested bases and design in this study is expected to enhance the practice of environmental cost accounting. It is rightly observed by Salomone, and Galluccio (2001:34) that 'descriptive non financial information cannot help the reader to understand the interactions between the company and the environment in quantitative and financial terms.' They therefore, gave the opinion that 'qualitative disclosure must be accompanied by the same type of precise and clear financial information that is useful to reconstruct the economic consequences deriving from environmental problems.' In the same thought, it is considered that although environmental information could be published in other company forms such as in social reports, press releases, company websites, among others, but it is only in the corporate Annual Reports can these information be accepted as authentic, acceptable and justifiable.

5.5 CONTRIBUTION TO KNOWLEDGE

This study proffers a framework for environmental cost accounting, accountability reporting and corporate performance in the Oil & Gas and manufacturing sectors in Nigeria. This also contributes to studies on environmental accounting at a global level using the perspective of Nigeria which is a developing country. It will facilitate the improvement in disclosure requirements to meet the need of pressured stakeholders such as communities affected by risk of local pollution and degradation. The study lends support to the framework of eco-efficiency which forms the basis of Environmental Quality Cost Model (ECQM). While

future research on the subject is further engendered, environmental accounting will be explored in all productive sectors of the economy, and other spheres of human endeavours as far as environmental issues and need for clean technology are concerned.

5.6 AREAS OF FUTURE RESEARCH

Arising from this study, areas which require future focus of study are as follows:

- Valuation for environmental cost and environmental revenue accounting both for efficient internal reporting and statutory financial reporting and disclosure
- Explore further three discounting models for Cost Benefit Analysis for environmental capital project evaluation: i.) the constant exponential model, ii.) Newell-Pizer Discount Model and iii.) State Space Model. and
- Issues for EMA Guidance Document, and local guidelines for translating into a Regulatory Guides.
- The System of National Accounts (SNA) which is the need for environmental dimension of the National Income Accounting.

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APPENDIX 1: CATEGORIES OF LISTED COMPAMNIES IN THE NIGERIAN STOCK EXHANGE MARKET AND THE SECURITIES EXCHANGE COMMISION

CATEGORY	NUMBER OF COMPANIES
Agricultural	6
Automobile and Tyres	5
Aviation	3
Banking	22
Breweries	7
Building and materials	8
Chemical and Paints	7
Commercial /Services	1
Computer and Office Equipment	6
Conglomerates	9
Construction	6
Engineering Technology	3
Food/Beverages & Tobacco	15
Footwear	2
Healthcare	11
Hotel and Tourism	1
Industrial /Domestic Products	12
Insurance	25
Leasing	1
Machinery marketing	3
Managed Funds	3
Maritime	1
Mortgage companies	1
Packaging	8
Petroleum marketing	8
Printing and Publishing	4
Real Estate	1
Road Transportation	1
Textiles	6

The foreign listing	1
Second – Tier securities	16
Petroleum (Upstream)	8
	211
	===

APPENDIX 2: Annex A Greenhouse gases

Carbon dioxide (CO_2)

Methane (CH_4)

Nitrous oxide (N_{20})

Hydrofluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Sulphur hexafluoride (SF_6)

Sectors/source categories

Energy

Fuel combustion

Energy industries

Manufacturing industries and construction

Transport

Other sectors

Other

Fugitive emissions from fuels

Solid fuels

Oil and natural gas

Other

Industrial processes

Mineral products

Chemical industry

Metal production

Other production

Production of halocarbons and sulphur hexafluoride

Consumption of halocarbons and sulphur hexafluoride

Others

Solvent and other product use

Agriculture

Enteric fermentation

Manure management

Rice cultivation

Agricultural soils

Prescribed burning of savannas

Field burning of agricultural residues

Other

Waste

Solid waste disposal on land

Wastewater handling

Waste incineration

Other

APPENDIX 3: SHELL OIL SPILLS IN NIGERIA

Year	Number of Spills	Volume	Caused by Corrosion	Volume
1997	254	76,000 barrels	63	11,533
1998	242	50,200	59	21,548
1999	319	23,377	48	NA

Source: http://www.shellnigeria.com/frame.asp?page=1999EnvRep

APPENDIX 4: SUMMARY OF WELLS DRILLED IN VARIOUS ECOLOGICAL ZONES IN NIGERIA – 1960 – 1985

YEAR	OFFSHORE	LAND	SWAMP	TOTAL
1960-1966	131	363	114	608
1967	65	76	26	165
1968	61	71	10	150
1969	83	63	6	152
1970	78	53	24	155

1971	84	88	51	223
1972	74	115	61	250
1973	91	112	34	237
1974	92	114	44	250
1975	63	95	37	195
1976	41	59	48	148
1977	41	41	40	122
1978	33	48	33	114
1979	42	48	41	137
1980	34	46	44	124
1981	49	66	36	157
1982	41	47	28	116
1983	40	24	18	82
1984	35	29	14	78
1985	19	23	25	67
TOTAL	**1,196**	**1,581**	**748**	**3,525**

Source: Ifeadi, Nwankwo, Skaluo and Orubina as in Uchegbu (2002:33)

APPENDIX 5: CRUDE OIL PRODUCTION IN NIGERIA AND SPILLAGE DURING THE 1970 – 1983 PERIOD

Year	Qty. of crude oil produced (in '000 barrels)	No. of crude Oil spills	Qty. of crude oil spills (in unit barrels)
1970	395,689	1	150
1971	558,689	14	15,110
1974	823,320	105	-
1976	758,058	128	20,023
1977	766,055	104	31,144
1978	696,324	154	97,250
1979	845,463	157	630,405
1980	760,117	241	558,053
1981	525,291	233	22,840
1982	470,638	213	33,612
1983	450,961	130	32,467

Source: CBN Statistical Bulletin No.1, 1995

APPENDIX 6: POTENTIAL IMPACT OF OIL OPERATION ON THE NIGERIA ENVIRONMENT

Gas flaring	Causes very high temperature within the area. The excessive heat has withered some vegetation species. Also, suppress growth,

	flowering and fruitfulness of plants. It diminishes agricultural production in the environment. There is air pollution as a result of continuous combustion.
Oil Drilling and Leakages	Effects are far reaching as follows: - accumulation of toxic materials - oil pollution of the sea, beaches and land - destruction of water and ocean fishing - destruction of breeding ground for marine life - pollution of underground water - destruction of mangrove waters and plants.
Platforms and tank farms	There is water and land pollution from leaking lubricating oil and sanitary wastes.
Fuel loading environment	Spillage arising from loading operations and the effect on the fauna and flora
Storage depots	- Land pollution from drums and other chemical containers. - Air pollution from storage tanks - Air pollution from gases and chemical fumes
Transportation through pipelines	- Sedimentation along pipeline routes - Water and land pollution resulting from leakages of divers intensity - Hazards of oil pipeline leakages, e.g. fire outbreaks and destruction of lives and properties. - Air pollution and hazards of accidents from transportation trucks
Petroleum Refineries	Air and environmental pollution

Health Effect on man	Man's health is affected adversely in all petroleum activities

Source: Adapted from Anne Ene-Ita as in Uchegbu (2002:40

APPENDIX 7: LISTED COMPANY SEARCH RESULTS (NIGERIAN STOCK EXCHANGE)

COMPANY		LOCATION
AGRICULTURE		
1.	Ellah Lakes Plc.	Nigeria
2.	Grommac Industries Plc.	Nigeria
3.	Livestock Feeds Plc.	Nigeria
4.	Okitipupa Oil Palm Plc.	Nigeria
5.	Okomu Oil Palm Plc.	Nigeria
6.	Presco Plc	Nigeria
AUTOMOBILE AND TYRE		
1.	Dunlop Nigeria Plc.	Nigeria
2.	Incar Nigeria Plc.	Nigeria
3.	Intra Motors Plc.	Nigeria
4.	R.T Brisco Plc.	Nigeria
5.	Rietzcot Nigeria Co. Plc.	Nigeria
AVIATION		
1.	Albarika Plc.	Nigeria
2.	Aviation Development Company Plc.	Nigeria
3.	Nigerian Aviation Handling Coy Plc.	Nigeria
BANKING		
1.	Access Bank Nigeria Plc.	Nigeria
2.	Afribank Nigeria Plc.	Nigeria

3.	Diamond Bank Nigeria Plc.	Nigeria
4.	Ecobank Nigeria PLC.	Nigeria
5.	Fidelity Bank Plc.	Nigeria
6.	First Bank of Nigeria Plc.	Nigeria
7.	First City Monument Bank Plc.	Nigeria
8.	First Inland Bank Plc.	Nigeria
9.	Guaranty Trust Bank Plc.	Nigeria
10.	IBTC Chartered Bank Plc.	Nigeria
11.	Intercontinental Bank Plc.	Nigeria
12.	Oceanic Bank International Nig. Plc.	Nigeria
13.	PlatinumHabib Bank Plc.	Nigeria
14.	Skye Bank Plc.	Nigeria
15.	Spring Bank Plc.	Nigeria
16.	Sterling Bank Plc.	Nigeria
17.	United Bank for Africa Plc.	Nigeria
18.	Union Bank Nig. Plc.	Netherlands
19.	Unity Bank Plc.	Nigeria
20.	Universal Trust Bank Plc.	Nigeria
21.	Wema Bank Plc.	Nigeria
22.	Zenith Bank Plc.	Nigeria

BREWERIES

1.	Champion Breweries PLC.	Nigeria
2.	Golden Guinea Brew Plc.	Nigeria
3.	Guinness Nigeria Plc.	Nigeria
4.	International Breweries Plc.	Nigeria
5.	Jos International Breweries Plc.	Nigeria
6.	Nigerian Breweries Plc.	Nigeria
7.	Premier Breweries Plc	Nigeria

BUILDING MATERIALS

1.	Ashaka Cement Plc.	Nigeria
2.	Benue Cement Company Plc.	Nigeria

3.	Cement Company of Northern Nig. Plc.	Nigeria
4.	Ceramic Manufacturers Nig. Plc.	Nigeria
5.	Nigeria Cement Plc.	Nigeria
6.	Nigerian Ropes Plc.	Nigeria
7.	Nigeria Wire Industries Plc.	Nigeria
8.	West Africa Portland Company Plc.	Nigeria

CHEMICAL AND PAINTS

1.	African Paints Nig. Plc.	Nigeria
2.	Berger Paints Plc.	Nigeria
3.	CAP Plc.	Nigeria
4.	DN Meyer Plc.	Nigeria
5.	IPWA Plc.	Nigeria
6.	Nigeria – German Chemicals Plc.	Nigeria
7.	Premier Paints Plc.	Nigeria

COMMERCIAL SERVICES

1.	Trans-Nation Wide Plc.	Nigeria

COMPUTER AND OFFICE EQUIPMENT

1.	Atlas Nigeria Plc.	Nigeria
2.	Hallmark Paper Products Plc.	Nigeria
3.	NCR (Nig.) Plc.	Nigeria
4.	Thomas Wyatt Nig. Plc.	Nigeria
5.	Tripple Gee and Company Plc.	Nigeria
6.	Wiggins Teape Nigeria Plc.	Nigeria

CONGLOMERATES

1.	A.G. Leventis Nigeria Plc.	Nigeria
2.	Chellarams Plc.	Nigeria
3.	John Holt Plc.	Nigeria
4.	P.Z. Industries Plc.	Nigeria
5.	SCOA Nigeria Plc.	Nigeria
6.	Transnational Corp. of Nig. Plc.	Nigeria

7.	UACN Plc.	Nigeria
8.	Unilever Nig. Plc.	Nigeria

CONSTRUCTION

1.	Arbico Plc.	Nigeria
2.	Cappa & D'Alberto Plc.	Nigeria
3.	Costain (WA) Plc.	Nigeria
4.	G. Cappa Plc.	Nigeria
5.	Julius Berger Nig. Plc.	Nigeria
6.	Roads Ni. Plc.	Nigeria

ENGINNERING TECHNOLOGY

1.	Interlinked Technologies Plc.	Nigeria
2.	Nigerian Wire and Cable Plc.	Nigeria
3.	Onwuka Hi-Tek Industries Plc.	Nigeria

FOOD/BEVERAGES AND TOBACCO

1.	7 Up Bottling Company Plc.	Nigeria
2.	Beverages (West Africa) Plc.	Nigeria
3.	Cadbury Nigeria Plc.	Nigeria
4.	Dangote Sugar Refinery Plc.	Nigeria
5.	Ferdinand Oil Mills Plc.	Nigeria
6.	Flour Mills Nig. Plc.	Nigeria
7.	Foremost Dairies Plc.	Nigeria
8.	Northern Nigeria Flour Mills Plc.	Nigeria
9.	National Salt Co. Nig. Plc.	Nigeria
10.	Nestle Nig. Plc.	Nigeria
11.	Nig. Bottling Company Plc.	Nigeria
12.	P.S Mandrides & Co. Plc.	Nigeria
13.	Tate Industries Plc.	Nigeria
14.	UTC. Nig. Plc.	Nigeria
15.	Union Dicon Salt Plc.	Nigeria

FOOTWARE

1.	Footwear and Accessories Man. Plc.	Nigeria
2.	Lennards (Nig.) Plc.	Nigeria

HEALTH CARE

1.	Aboseldehyde Labs. Plc.	Nigeria
2.	BCN Plc.	Nigeria
3.	Chriestlieb Plc.	Nigeria
4.	Ekocorp Plc.	Nigeria
5.	Evans Medical Plc.	Nigeria
6.	GlaxoSmithkline Consumer Nig. Plc.	Nigeria
7.	Maureen Laboratories Plc.	Nigeria
8.	May & Baker Nig. Plc.	Nigeria
9.	Morison Industries Plc.	Nigeria
10.	Neimeth International Pharm. Plc.	Nigeria
11.	Pharma – Deko Plc.	Nigeria

HOTEL AND Tourism

1.	Tourist Company of Nigeria Plc.	Nigeria

INDUSTRIAL / DOMESTIC PRODUCTS

1.	Aluminium Extrusion Industries Plc	Nigeria
2.	Aluminium Manufacturing Company of Nigeria Plc	Nigeria
3.	B.O.C. Gases Plc	Nigeria
4.	Epic Dynamics Plc	Nigeria
5.	First Aluminium Nigeria Plc	Nigeria
6.	Liz- Olofin and Company Plc	Nigeria
7.	Nigeria Enamelware Company Plc	Nigeria
8.	Nigerian Lamps Industries Plc	Nigeria
9.	Niyamco Plc	Nigeria
10.	Oluwa Glass Company Plc	Nigeria
11.	Vitafoam Nigeria Plc	Nigeria
12.	Vono Products Plc.	Nigeria

INSURANCE

1.	Acem Insurance Plc.	Nigeria

2.	Aiico Insurance Plc	Nigeria
3.	Amicable Assurance Plc	Nigeria
4.	Baico Insurance Plc	Nigeria
5.	Confidence Insurance Plc.	Nigeria
6.	Cornerstone Insurance Company Plc	Nigeria
7.	Crusader Insurance Plc	Nigeria
8.	First Assurance Plc.	Nigeria
9.	Great Nigerian Insurance	Nigeria
10.	Guinea Insurance Plc	Nigeria
11.	Lasaco Assurance Plc	Nigeria
12.	Law Union & Rock Insurance Plc	Nigeria
13.	Linkage Assurance Plc	Nigeria
14.	Mutual Benefits Assurance Plc.	Nigeria
15.	N.E.M. Insurance Co (Nigeria) Plc	Nigeria
16.	NFI Insurance Plc	Nigeria
17.	Niger Insurance Company Plc	Nigeria
18.	Prestige Assurance Plc	Nigeria
19.	Royal Exchange Assurance Plc	Nigeria
20	Security Assurance Plc	Nigeria
21.	Sovereign Trust Assurance Plc.	Nigeria
22.	Standard Alliance Insurance Plc.	Nigeria.
23.	Sun Insurance Nigeria Plc	Nigeria
24.	UNIC Insurance Plc	Nigeria
25.	West African Provincial Insurance Company Plc	Nigeria

LEASING

1.	C & I Leasing Plc	Nigeria

MACHINERY (MARKETING)

1.	Blackwood Hodge (Nig) Plc.	Nigeria
2.	Nigeria Sewing Machine Co. Plc	Nigeria
3.	Stokvis Nig. Plc	Nigeria

MANAGED FUNDS

1.	First Capital Inv. Trust Plc.	Nigeria
2.	Nigeria Energy Sector Fund	Nigeria
3.	Nigeria Int. Debt Fund Plc	Nigeria

MARITIME

1.	Japaul Oil and Maritime Services Plc.	Nigeria

MORTGAGE COMPANIES

1.	Union Homes Savings and Loans Plc	Nigeria

PACKAGING

1.	Abplast Products Plc	Nigeria
2.	Avon Crown Caps & Containers Plc	Nigeria
3.	Beta Glass Co. Plc	Nigeria
4.	Greif Nigeria Plc	Nigeria
5.	Nampak Plc	Nigeria
6.	Poly Products (Nig.) Plc	Nigeria
7.	Studio Press (Nig.) Plc	Nigeria
8.	W.A. Glass Ind. Plc	Nigeria

PETROLEUM MARKETING

1.	African Petroleum Plc	Nigeria
2.	Afroil Plc	Nigeria
3.	Chevron Oil Nigeria Plc	Nigeria
4.	Conoil Plc	Nigeria
5.	Eternal Oil & Gas Plc	Nigeria
6.	Mobil Oil Nig. Plc	Nigeria
7.	Oando Plc	Nigeria
8.	Total Nigeria Plc	Nigeria

PRINTING AND PUBLISHING

1.	Academy Press Plc	Nigeria
2.	Daily Times Plc	Nigeria
3.	Longman Nigeria Plc	Nigeria
4.	University Press Plc	Nigeria

REAL ESTATE

1.	UAC Property Development	Nigeria

ROAD TRANSPORTATION

1.	Associated Bus Company Plc	Nigeria

TEXTILES

1.	Aba Textile Mills Plc	Nigeria
2.	Afprint Nig. Plc	Nigeria
3.	Asaba Textile Mill Plc	Nigeria
4.	Enpee Industries Plc	Nigeria
5.	Nig. Textile Mills Plc	Nigeria
6.	United Nigeria Textiles Plc	Nigeria

THE FOREIGN LISTING

Ecobank Trans Incorporated	Foreign
Chevron Nigeria Limited	Foreign
Elf Petroleum Nig. Ltd.	Foreign
Texaco Overseas Petroleum Company Ltd.	Foreign
Mobil Oil Producing Company Unlimited	Foreign
Nigeria Agip Oil Company Limited	Foreign
Shell Petroleum Development Company	Foreign

OTHER INDEGENOUS OIL COMPANIES NOT LISTED

Dubril Oil Company Ltd.

Consolidated Oil Company Ltd.

Yinka Folawiyo Petroleum Ltd.

Cavendish Petroleum,

Amoco Nigeria Petroleum Company Ltd.

Pan Ocean Oil Corporation Ltd.

Ashland Petroleum Company

SECOND TIER SECURITIES

Adswitch Plc

Afrik Pharmaceuticals Plc

Anino Internation Plc

Capital Oil Plc

Cutix Plc

Flexible Packaging Plc

Juli Plc

Krabo Nigeria Plc

NewPak Plc

Rak Unity Pet. Company Plc

Rokana Industries Plc

Smart Products Nig. Plc

Tropical Pet. Products Plc

Udeofson Garment FCT. Nig. Plc

Union Ventures & Pet. Plc

W.A. Aluminium Products Plc.

Total Population of listed companies	**215**

APPENDIX 8: SAMPLE COMPANIES AND LATEST ANNUAL REPORTS

COMPANY	LATEST ANNUAL REPORT YEAR
AGRICULTURE	
Ellah Lakes Plc.	
Grommac Industries Plc.	
Livestock Feeds Plc.	
Okitipupa Oil Palm Plc.	
Okomu Oil Palm Plc.	2006, 2005
Presco Plc	2005
Cashew Nut Processing Ind.	2005
AUTOMOBILE AND TYRE	
1. Dunlop Nigeria Plc.	2006, 2005
2. Incar Nigeria Plc.	2006, 2005
3. Intra Motors Plc.	2004
4. R.T Briscoe Plc.	2004
5. Rietzcot Nigeria Co. Plc.	
BREWERIES	
1. Champion Breweries PLC.	2005, 2004
2. Golden Guinea Brew Plc.	
3. Guinness Nigeria Plc.	2006, 2005
4. International Breweries Plc.	

5.	Jos International Breweries Plc.	
6.	Nigerian Breweries Plc.	2004
7.	Premier Breweries Plc	

BUILDING MATERIALS

1.	Ashaka Cement Plc.	2006, 2005
2.	Benue Cement Company Plc.	2003
3.	Cement Company of Northern Nig. Plc.	2006, 2005
4.	Ceramic Manufacturers Nig. Plc.	
5.	Nigeria Cement Plc.	
6.	Nigerian Ropes Plc.	
7.	Nigeria Wire Industries Plc.	
8.	West Africa Portland Company Plc.	2004

CHEMICAL AND PAINTS

1.	African Paints Nig. Plc.	
2.	Berger Paints Plc.	
3.	CAP Plc.	
4.	DN Meyer Plc.	2006, 2005
5.	IPWA Plc.	
6.	Nigeria – German Chemicals Plc.	2006, 2005
7.	Premier Paints Plc.	

CONGLOMERATES

1.	A.G. Leventis Nigeria Plc.	2004
2.	Chellarams Plc.	2004
3.	John Holt Plc.	2004
4.	P.Z. Industries Plc.	2006, 2005
5.	SCOA Nigeria Plc.	2006, 2005
6.	Transnational Corp. of Nig. Plc.	
7.	UACN Plc.	2,006, 2005
8.	Unilever Nig. Plc.	2005

FOOD/BEVERAGES AND TOBACCO

1. 7 Up Bottling Company Plc.
2. Beverages (West Africa) Plc.
3. Cadbury Nigeria Plc. 2005
4. Dangote Sugar Refinery Plc.
5. Ferdinand Oil Mills Plc.
6. Flour Mills Nig. Plc.
7. Foremost Dairies Plc.
8. Northern Nigeria Flour Mills Plc.
9. National Salt Co. Nig. Plc.
10. Nestle Nig. Plc.
11. Nig. Bottling Company Plc.
12. P.S Mandrides & Co. Plc.
13. Tate Industries Plc.
14. UTC. Nig. Plc. 2006, 2005
15. Union Dicon Salt Plc.

FOOTWARE

1. Footwear and Accessories Man. Plc.
2. Lennards (Nig.) Plc.

HEALTH CARE

1. Aboseldehyde Labs. Plc.
2. BCN Plc.
3. Chriestlieb Plc.
4. Ekocorp Plc.
5. Evans Medical Plc.
6. GlaxoSmithkline Consumer Nig. Plc. 2005
7. Maureen Laboratories Plc.
8. May & Baker Nig. Plc.
9. Morison Industries Plc.
10. Neimeth International Pharm. Plc. 2006, 2005
11. Pharma – Deko Plc.

INDUSTRIAL / DOMESTIC PRODUCTS

1.	Aluminium Extrusion Industries Plc	
2.	Aluminium Manufacturing Company of Nigeria Plc	2004
3.	B.O.C. Gases Plc	
4.	Epic Dynamics Plc	
5.	First Aluminium Nigeria Plc	
6.	Liz- Olofin and Company Plc	
7.	Nigeria Enamelware Company Plc	2005
8.	Nigerian Lamps Industries Plc	
9.	Niyamco Plc	
10.	Oluwa Glass Company Plc	
11.	Vitafoam Nigeria Plc	2006, 2005
12.	Vono Products Plc.	

MARITIME

1.	Japaul Oil and Maritime Services Plc.	2006, 2005

PACKAGING

1.	Abplast Products Plc	
2.	Avon Crown Caps & Containers Plc	
3.	Beta Glass Co. Plc	
4.	Greif Nigeria Plc	
5.	Nampak Plc	
6.	Poly Products (Nig.) Plc	2006, 2005
7.	Studio Press (Nig.) Plc	2006, 2005
8.	W.A. Glass Ind. Plc	2006,2005

PETROLEUM MARKETING

1.	African Petroleum Plc	
2.	Afroil Plc	
3.	Chevron Oil Nigeria Plc	2006, 2005
4.	Conoil Plc	2006, 2005
5.	Eternal Oil & Gas Plc	2006, 2005

6.	Mobil Oil Nig. Plc	2005
7.	Oando Plc	2004
8.	Total Nigeria Plc	

PRINTING AND PUBLISHING

1.	Academy Press Plc	2006, 2005
2.	Daily Times Plc	
3.	Longman Nigeria Plc	2005
4.	University Press Plc	2006, 2005

TEXTILES

1.	Aba Textile Mills Plc	
2.	Afprint Nig. Plc	2006, 2005
3.	Asaba Textile Mill Plc	
4.	Enpee Industries Plc	2004
5.	Nig. Textile Mills Plc	
6.	United Nigeria Textiles Plc	2006, 2005

THE FOREIGN LISTING

Elf Petroleum Nig. Ltd.

Texaco Overseas Petroleum Company Ltd.2005

Mobil Oil Producing Company Unlimited

Nigeria Agip Oil Company Limited

Shell Petroleum Development Company 2004

OTHER INDEGENOUS OIL COMPANIES NOT LISTED

Dubril Oil Company Ltd.

Consolidated Oil Company Ltd.

Yinka Folawiyo Petroleum Ltd.

Cavendish Petroleum,

Amoco Nigeria Petroleum Company Ltd.

Pan Ocean Oil Corporation Ltd.

Ashland Petroleum Company

SECOND TIER SECURITIES

Adswitch Plc	
Afrik Pharmaceuticals Plc	
Anino Internation Plc	
Capital Oil Plc	
Cutix Plc	
Flexible Packaging Plc	
Juli Plc	
Krabo Nigeria Plc	
NewPak Plc	
Rak Unity Pet. Company Plc	
Rokana Industries Plc	
Smart Products Nig. Plc	
Tropical Pet. Products Plc	
Udeofson Garment FCT. Nig. Plc	
Union Ventures & Pet. Plc	
W.A. Aluminium Products Plc.	
Total number of companies in sample size	**132**

APPENDIX 9: Factor Analysis

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
EOPEX	185.16	39.751	129
ECAPEX	190.31	54.829	129
COTEC	204.00	46.500	129
PODET	119.06	43.851	129
POPREV	205.69	46.739	129
EEXTC	241.56	44.694	129

Correlation Matrix

		EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Correlation	EOPEX	1.000	.670	-.573	-.415	-.426	-.326
	ECAPEX	.670	1.000	-.545	-.487	-.388	-.368
	COTEC	-.573	-.545	1.000	.540	.511	.394
	PODET	-.415	-.487	.540	1.000	.488	.503
	POPREV	-.426	-.388	.511	.488	1.000	.489
	EEXTC	-.326	-.368	.494	.503	.489	1.000
Sig. (1-tailed)	EOPEX		.000	.000	.000	.000	.004
	ECAPEX	.000		.000	.000	.001	.001
	COTEC	.000	.000		.000	.000	.001
	PODET	.000	.000	.000		.000	.000
	POPREV	.000	.001	.000	.000		.000
	EEXTC	.004	.001	.001	.000	.000	

KMO and Bartlett's Test

Kaiser-Meyer-OLKIN Measure of Sampling Adequacy		.834
Bartlett's Test of Sphericity	Approx. Chi-Square	139.571
	df	15
	Sig.	.000

Anti-Image Matrices

		EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Anti-Image Covariance	EOPEX	.481	-.240	.132	-1.05E-02	6.871E-02	-2.43E-03
	ECAPEX	-.240	.483	7.519E-02	9.894E-02	-1.10E-02	4.517E-02
	COTEC	.132	7.519E-02	.514	-.133	-.124	-1.87E-02
	PODET	-1.05E-02	9.894E-02	-.133	.563	-9.81E-02	-.168
	POPREV	6.871E-02	-1.10E-02	-.124	-9.81E-02	.608	-.177
	EEXTC	-2.43E-03	4.517E-02	-1.87E-02	-.168	-.177	.661
Anti-Image Correlation	EOPEX	.787[a]	-.498	.266	-2.02E-02	.127	-4.31E-03
	ECAPEX	-.498	.802[a]	.151	.190	-2.03E-02	8.000E-02
	COTEC	2.66	.151	.867[a]	-.247	-.222	-3.21E-02
	PODET	-2.02E-02	.190	-.247	.856[a]	-.168	-.275
	POPREV	.127	-2.03E-02	-.222	-.168	.861[a]	-.280
	EEXTC	-4.31E-03	8.000E-02	-3.21E-02	-.275	-.280	.847[a]

Measure of Sampling Adequacy (MSA)

Communalities

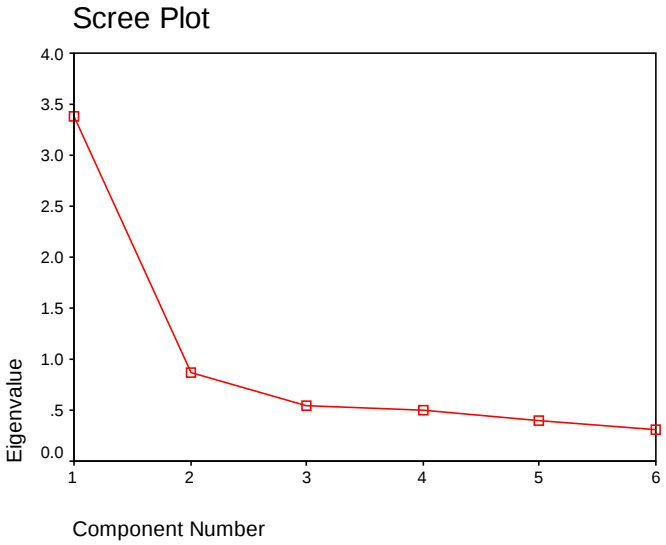
	Initial	Extraction
EOPEX	1.000	.586
ECAPEX	1.000	.601
COTEC	1.000	.641
PODET	1.000	.582
POPREV	1.000	.530
EEXTC	1.000	.445

Extraction Method: Principal Component Analysis

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.383	56.389	56.389	3.383	56.389	56.389
2	.861	14.354	70.743			
3	.543	9.047	79.790			
4	.505	8.422	88.212			
5	.309	6.652	94.865			
6	.308	5.135	100.000			

Extraction Method: Principal Component Analysis



Component Matrix[a]

	Component
	t
EOPEX	-.765
ECAPEX	-.775
COTEC	.800
PODET	.763
POPREV	.728
EEXTC	.667

Extraction Method: Principal Component Analysis

1 component extracted

Reproduced Correlations

		EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Reproduced Correlation	EOPEX	.585[b]	.593	-.612	-.583	-.557	-.510
	ECAPEX	.593	.601[b]	-.621	-.591	-.564	-.517
	COTEC	-.612	-.621	.641[b]	.610	.582	.534
	PODET	-.583	-.591	.610	.582[b]	.555	.509
	POPREV	-.557	-.564	.582	.555	.530[b]	.486
	EEXTC	-.510	-.517	.534	.509	.486	.445[b]
Residual[a]	EOPEX		7.694E-02	3.873E-02	.168	.131	.184
	ECAPEX	7.694E-02		7.599E-02	.104	.176	.149
	COTEC	3.873-02	7.599E-02		-.7.06E-02	-.7.14E-02	-.140
	PODET	.168	.104	-.7.06E-02		-6.73-02	-5.96E-03
	POPREV	.131	.176	-.7.14E-02	-.6.73E-02		3.760E-03
	EEXTC	.184	.149	-.140	-.5.96E-03	3.760E-03	

Extraction Method: Principal Component Analysis

a. Residuals are computed between observed and reproduced correlations. There are 12 (80.0% nonredundant residuals with absolute values greater than 0.05.

b. Reproduced communalities

Rotated Component Matrix[a]

Only one component was extracted.
The solution cannot be rotated.

Component Score Coefficient Matrix

	Component
	T
EOPEX	-.226
ECAPEX	-.229
COTEC	.237
PODET	.225
POPREV	.215
EEXTC	.197

Extraction Method: Principal Component Analysis

Component Score Covariance Matrix

Component	1
1	1.000

Extraction Method: Principal Component Analysis

APPENDIX 10: MODEL 1 SECONDARY DATA

Environmental Quality Reporting in Combined Oil and Gas and Manufacturing Sectors

REPQUALS	Mean	N	Std. Deviation
Indicont	92.92	49	75.691
Descont	1012.09	109	1485.863
Quantcont	1185.88	41	1173.374
Total	821.57	199	1289.433

Environmental Quality Reporting Separately in the Oil and Gas and Manufacturing Sectors

REPQUALS	Mean	N	Std. Deviation	Sum	Minimum	Maximum	Range
Indicontog	122.96	28	83.899	3443	25	253	228
Descontog	922.93	45	1432.255	41532	84	8150	8066
Quantcontog	978.05	20	960.524	19561	327	4140	3813
Indicontm	52.86	21	36.032	1110	26	124	98
Descontm	1074.7	64	1530.496	68786	90	5100	5010
Quantcontm	8	21	1338.959	29060	120	3540	3420
Total	1383.8	199	1289.433	163492	25	8150	8125
	1						
	821.57						

Means

Environmental Quality Reporting Summary for Sub-sectors

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Environmental Reporting Quality * Sub-sectors	199	22.1%	701	77.9%	900	100.0%

Environmental Quality Reporting Summary in the Sub-sectors

Sub-sectors	Mean	N	Std. Deviation	Minimum	Maximum	Range
Pm	439.96	47	384.907	25	1348	1323
flog	1188.86	35	1714.753	84	8150	8066
iog	204.36	11	72.401	92	253	161
automt	124.00	4	.000	124	124	0
brew	183.44	16	165.338	27	440	413
buidm	739.57	14	372.501	258	1016	758
chempt	287.65	17	144.678	120	480	360
congl	206.07	14	129.919	45	364	319
foodb	1764.90	29	1897.400	37	5100	5063
healthc	2184.50	12	1814.861	26	4520	4494
Total	821.57	199	1289.433	25	8150	8125

Means

Environmental Quality Reporting Summary for Sectors

Sub-sectors	Mean	N	Std. Deviation	Minimum	Maximum	Range
Oil & Gas	693.94	93	1147.216	25	8150	8125
Manufacturing	933.55	106	1398.219	26	5100	5074
Total	821.57	199	1289.433	25	8150	8125

One Way

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	82559370	9	9173263.358	7.029	.000
Within Groups	2.47E+08	189			
Total	3.29E+08	198	1304989.527		

Dependent Variable Environmental Reporting
Scheffe

(I) Sub-sector	(J) Sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound

pm	flog	-748.90	255.051	.476	-1811.80	314.00
	iog	235.59	382.624	1.000	-1356.95	1830.14
	automt	315.96	594.990	1.000	-2163.60	2795.52
	brew	256.52	330.647	1.000	-1121.42	1634.46
	buidm	-299.61	347.821	1.000	-1749.12	1149.89
	chempt	152.31	323.311	1.000	-1195.05	1499.67
	congl	233.89	347.821	1.000	-1215.62	1683.39
	foodb	-1324.94*	269.751	.006	-2449.10	-200.78
	healthc	-1744.54*	369.479	.011	-3284.31	-204.78
flog	pm	748.90	255.051	.476	-314.00	1811.80
	iog	984.49	394.868	.717	-661.08	2630.07
	automt	1064.86	602.937	.958	-1447.82	3577.53
	brew	1005.42	344.742	.487	-431.26	2442.10
	buidm	449.29	361.246	.997	-1056.17	1954.74
	chempt	901.21	337.712	.625	-506.17	2308.59
	congl	982.79	361.246	.596	-522.67	2488.24
	foodb	-576.04	286.854	.907	-1771.47	619.39
	healthc	-995.64	382.145	.659	-2588.19	596.91
iog	pm	-235.59	382.624	1.000	-1830.14	1358.95
	flog	-984.49	394.868	.717	-2630.07	661.08
	automt	80.36	666.995	1.000	-2699.27	2860.00
	brew	20.93	447.434	1.000	-1843.71	1885.56
	buidm	-535.21	460.271	.998	-2453.34	1382.92
	chempt	-83.28	442.040	1.000	-1925.44	1758.87
	congl	-1.71	460.271	1.000	-1919.84	1916.42
	foodb	-1560.53	404.518	.103	-3246.32	125.26
	healthc	-1980.14	476.849	.052	-3967.35	7.08
automt	pm	-315.96	594.990	1.000	-2795.52	2163.60
	flog	-1064.86	602.937	.958	-3577.53	1447.82
	iog	-80.36	666.995	1.000	-2860.00	2699.27
	brew	-59.44	638.599	1.000	-2720.74	2601.86
	buidm	-615.57	647.658	1.000	-3314.62	2083.48
	chempt	-163.65	634.834	1.000	-2809.24	2481.95
	congl	-82.07	647.658	1.000	-2781.12	2616.98
	foodb	-1640.90	609.300	.611	-4180.09	898.30
	healthc	-2060.50	659.543	.376	-4809.08	688.08
Brew	pm	-256.52	330.647	1.000	-1634.46	1121.42
	flog	-1005.42	344.742	.487	-2442.10	431.26
	iog	-20.93	447.434	1.000	-1885.56	1843.71
	automt	59.44	638.599	1.000	-2601.86	2720.74
	buidm	-556.13	418.061	.994	-2298.36	1186.09
	chempt	-104.21	397.902	1.000	-1762.43	1554.01
	congl	-22.63	418.061	1.000	-1764.86	1719.59
	foodb	-1581.46*	355.755	.024	-3064.03	-98.89
	healthc	-2001.06*	436.246	.016	-3819.08	-183.05

Dependent Variable Environmental Reporting
Scheffe

(I) Sub-sector	(J) Sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
buidm	pm	299.61	347.821	1.000	-1149.89	1749.12
	flog	-449.29	361.246	.997	-1954.74	1056.17
	iog	535.21	460.271	.998	-1382.92	2453.34
	automt	615.57	647.658	1.000	-2083.48	3314.62
	brew	556.13	418.061	.994	-1186.09	2298.36
	chempt	451.92	412.283	.999	-1266.22	2170.07
	congl	533.50	431.772	.997	-1265.87	2332.87
	foodb	-1025.33	371.770	.575	-2574.64	523.99
	healthc	-1444.93	449.403	.331	-3317.77	427.91
chempt	pm	-152.31	323.311	1.000	-1499.67	1195.05
	flog	-901.21	337.712	.625	-2308.59	506.17
	iog	83.28	442.040	1.000	-1758.87	1925.44
	automt	163.65	634.832	1.000	-2481.95	2809.24
	brew	104.21	397.902	1.000	-1554.01	1762.43
	buildm	-451.92	412.283	.999	-2170.07	1266.22
	congl	81.58	412.283	1.000	-1636.57	1799.72
	foodb	-1477.25*	348.947	.042	-2931.45	-23.05
	healthc	-1896.85*	430.712	.027	-3691.80	-101.90
congl	pm	-233.89	347.821	1.000	-1683	1215.62
	flog	-982.79	361.246	.596	-2488.24	522.67
	iog	1.71	460.271	1.000	-1916.42	1919.84
	automt	82.07	647.658	1.000	-2616.98	2781.12
	brew	22.63	418.061	1.000	-1719.59	1764.86
	buidm	-533.50	431.772	.997	-2332.87	1265.87
	chempt	-81.58	412.283	1.000	-1799.72	1636.57
	foodb	-1558.83*	371.770	.047	-3108.14	-9.51
	healthc	-1978.43*	449.403	.027	-3851.27	-105.59
foodb	pm	1324.94*	269.751	.006	200.78	2449.10
	flog	576.04	286.854	.907	-619.39	1771.47
	iog	1560.53	404.518	.103	-125.26	3246.32
	automt	1640.90	609.300	.611	-898.30	4180.09
	brew	1581.46*	355.755	.024	98.89	3064.03
	buidm	1025.33	371.770	.575	-523.99	2574.64
	chempt	1477.25*	348.947	.042	23.05	2931.45
	congl	1558.83*	371.770	.047	9.51	3108.14
	healthc	-419.60	392.108	.999	-2053.67	1214.47
healthc	pm	1744.54*	369.479	.011	204.78	3284.31
	flog	995.64	382.145	.659	-596.91	2588.19
	iog	1980.14	476.849	.052	-7.08	3967.35
	automt	2060.50	659.543	.376	-688.08	4809.08
	brew	2001.06*	436.246	.016	183.05	3819.08
	buidm	1444.93	449.403	.331	-427.91	3317.77

chempt	1896.85*	430.712	.027	101.90	3691.80
congl	1978.43*	449.403	.027	105.59	3851.27
foodb	419.60	392.108	.999	-1214.47	2053.67

*The mean difference is significant at the 0.05 level

Means

Environmental Quality Reporting Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Environmental Quality *Sub-sectors	106	11.8%	794	88.2%	900	100%

Environmental Reporting Quality

Sub Sector	Mean	N	Std. Deviation	Minimum	Maximum	Range
Automt	124.00	4	.000	124	124	0
brew	183.44	16	165.338	27	440	413
buildm	739.57	14	372.501	258	1016	758
chempt	287.65	17	144.678	120	480	360
congl	206.07	14	129.919	45	364	319
foodb	1764.90	29	1897.400	37	5100	5063
healthc	2184.50	12	1814.861	26	4520	4494
Total	933.55	106	1398.219	26	5100	5074

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Quality Reporting	791.45	1266.292	174
TURNOVER	21603441	54872196.611	174

Correlations

		Reporting Quality	TURNOVER
Pearson Correlation	Reporting Quality	1.000	.044
	TURNOVER	.044	1.000

Sig. (1-tailed)	Reporting Quality TURNOVER	. .281	.281 .
N	Reporting Quality TURNOVER	174 174	174 174

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TURNOVER[a]	.	Entered

a. All requested variables entered
b. Dependent Variable reporting quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.044[a]	.002	-.004	1268.724

Predictors (Constant), TURNOVER

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	542959.13	1	542959.134	.337	.562[a]
	Residual	2.77E+08	172	1609661.709		
	Total	2.77E+08	173			

Predictors (Constant), TURNOVER
Dependent Variable: Reporting Quality

Coefficients[a]

Model	Unstandardized Coefficients		Standardized coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Intercept)	769.392	103.408		7.440	.000		
TURNOVER	1.021E-06	.000	.044	.581	.562	1.000	1.000.

Dependent Variable, Environmental Quality Reporting

Collinearity Diagnostics[a]

		Condition	Variance Proportion

Model	Dimension	Eigenvalue	Index	Constant	TURNOVER
1		1.367	1.000	.32	.32
	2	.633	1.470	.68	.68

Dependent Variable, Environmental Quality Reporting

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Quality Reporting	688.87	1069.413	150
PAT	478303.87	2353119.6494	150

Correlations

		Reporting Quality	PAT
Pearson Correlation	Reporting Quality	1.000	-.129
	PAT	-.129	1.000
Sig. (1-tailed)	Reporting Quality	.	.058
	PAT	.058	.
N	Reporting Quality	150	150
	PAT	150	150

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PAT[a]	.	Entered

a. All requested variables entered

b. Dependent Variable reporting quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	129[a]	.017	.010	1064.085

b. Predictors (Constant), PAT

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2826277.4	1	2826277.371	2.496	.116 [a]
	Residual	1.68E+08	148	1132275.860		
	Total	1.70E+08	149			

a. Predictors (Constant), PAT
b. Dependent Variable: Reporting Quality

Coefficients [a]

Model		Unstandardized Coefficients		Standardized coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Intercept)	716.868	88.671		8.085	.000		
	PAT	-5.853E-05	.000	-.129	-1.580	.116	1.000	1.000.

a Dependent Variable, Environmental Quality Reporting

Collinearity Diagnostics [a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportion	
				Constant	TURNOVER
1	1	1.200	1.000	.40	.40
	2	.800	1.225	.60	.60

a Dependent Variable, Environmental Quality Reporting

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Quality Reporting	699.18	1074.056	148
NETASSET	2634163.6	6008877.5751	148

Correlations

		Reporting Quality	NETASSET
Pearson Correlation	Reporting Quality	1.000	.003
	NETASSET	.003	1.000
Sig. (1-tailed)	Reporting Quality	.	.487
	NETASSET	.487	.
N	Reporting Quality	148	148
	NETASSET	148	148

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	NETASSET[a]	.	Entered

a. All requested variables entered
b. Dependent Variable reporting quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.003[a]	.000	-.007	1077.724

Predictors (Constant), NETASSET

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1241.738	1	1241.738	.001	.974[a]
	Residual	1.70E+08	146	1161488.701		
	Total	1.70E+08	147			

a. Predictors (Constant), NETASSET
Dependent Variable: Reporting Quality

Coefficients[a]

Model		Unstandardized Coefficients		Standardized coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Intercept)	697.908	96.780		7.211	.000		
	NETASSET	4.837E-07	.000	.003	.033	.974	1.000	1.000.

a Dependent Variable, Environmental Quality Reporting

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportion	
				Constant	TURNOVER
1	1	1.403	1.000	.30	.30
	2	.597	1.532	.70	.70

a Dependent Variable, Environmental Quality Reporting

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Quality Reporting	712.42	1102.945	139
EPS	6.2365	31.58125	139

Correlations

		Reporting Quality	EPS
Pearson Correlation	Reporting Quality	1.000	-.098
	EPS	-.098	1.000
Sig. (1-tailed)	Reporting Quality	.	.126
	EPS	.126	.
N	Reporting Quality	139	139
	EPS	139	139

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EPS[a]	.	Entered

a. All requested variables entered
b. Dependent Variable reporting quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.098[a]	.010	.002	1101.638

a. Predictors (Constant), EPS

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1611392.6	1	1611392.646	1.328	.251[a]
	Residual	1.66E+08	137	1213605.455		
	Total	1.66E+08	138			

a. Predictors (Constant), EPS
b Dependent Variable: Reporting Quality

Coefficients[a]

	Unstandardized	Standardized			

Model		Coefficients B	Coefficients Std. Error	coefficients Beta	T	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Intercept)	733.764	95.257		7.703	. .000		
	EPS	-3.422	2.969	-.098	-1.152	.251	1.000	1.000.

a Dependent Variable, Environmental Quality Reporting

Collinearity Diagnostics [a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportion Constant	Variance Proportion TURNOVER
1	1	1.194	1.000	.40	.40
	2	.806	1.218	.60	.60

a Dependent Variable, Environmental Quality Reporting

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Environmental Reporting Quality	868.08	1350.692	177
TURNOVER	6594600	12207751.04	177
PAT	482961.9	1642659.299	177
NETASSET	3034250	5773722.713	177
EPS	3.5613	37.76224	177

Correlations

		Reporting Quality	TURNOVER	PAT	NETASSET	EPS
Pearson Correlation	Reporting Quality	1.000	.086	.090	.131	.008
	TURNOVER	.086	1.000	.840	.887	.320
	PAT	.090	.840	1.000	.834	.478
	NETASSET	.131	.887	.834	1.000	.500
	EPS	.008	.320	.478	.500	1.000
Sig. (1-tailed)	Reporting Quality	.	.128	.118	.041	.460
	TURNOVER	.128	.	.000	.000	.000
	PAT	.118	.000	.	.000	.000
	NETASSET	.0.41	.000	.000	.	.000
	EPS	.460	.000	.000	.000	.
N	Reporting Quality	177	177	177	177	177
	TURNOVER					
	PAT					
	NETASSET					
	EPS					

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.173 [a]	.030	.008	1345.549

a. Predictors (Constant), TURNOVER, PAT, NETASSET, EPS

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	9661813	4	2415453.319	1.334	.259 [a]
	Residual	3.11E+08	172	1810623.410		
	Total	3.21E+08	176			

a. Predictors (Constant), TURNOVER, PAT, NETASSET, EPS

b Dependent Variable: Environmental Quality Reporting

Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 Intercept	777.415	121.012		6.424	.000		
TURNOVER	-2.49E-05	.000	-.225	-1.171	.243	.152	6.568
PAT	2.707E-05	.000	.33	.213	.831	.237	4.219
NETASSET	8.468E-05	.000	.362	1.897	.060	.155	6.460
EPS	-4.188	3.402	-.117	-1.231	.220	.623	1.604

a. Dependent Variable, Environmental Quality Reporting

Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Intercept)	TURNOVER	PAT	NETASSET	EPS
1		3.227	1.000	.02	.01	.02	.01	.02
	2	.946	1.847	.38	.00	.01	.00	.29
	3	.611	2.298	.41	.02	.04	.00	.44
	4	.148	4.666	.19	.07	.88	.22	.01
	5	6.833E-02	6.872	.00	.89	.06	.77	.25

a. Dependent Variable: Environmental Quality Reporting

MODEL 2: PRIMARY DATA

Sectors

		Frequency	Valid Percent	Cumulative Percent
Valid	Oil and Gas	35	27.1%	27.1%
	Manufacturing	94	72.9%	100.0%
	Total	129		

Means

Environmental Quality Reporting Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ECOPEX * SECTOR	116	33.1%	234	66.9%	350	100.%
ECAPEX * SECTOR	104	29.7%	246	70.3%	350	100%
COTEC * SECTOR	118	33.7%	232	66.3%	350	100%
PODET * SECTOR	112	32.0%	238	68.0%	350	100%
POPREV * SECTOR	98	28.0%	252	72.0%	350	100%
EEXTC *SECTOR	101	28.9%	249	71.1%	350	100%

Environmental Quality Report

ECONOMIC SECTOR		ECOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Oil & Gas	Mean	164.53	165.52	215.25	132.22	223.76	276.25
	N	32	29	32	18	17	16
	Std. Deviation	39.131	55.907	43.847	34.395	44.687	27.538
	Minimum	90	90	96	80	132	200
	Maximum	240	300	300	180	276	300
	Range	150	210	204	100	144	100
Manufacturing	Mean	186.25	192.00	198.00	116.60	202.52	237.65
	N	84	75	86	94	81	85
	Std. Deviation	45.283	56.449	52.380	46.986	49.126	44.552
	Minimum	90	60	60	20	60	80
	Maximum	300	300	300	200	276	300
	Range	210	240	240	180	216	220
Total	Mean	180.26	184.62	202.68	119.11	206.20	243.76

N	116	104	118	112	98	101
Std. Deviation	44.584	57.284	50.616	45.432	48.838	44.516
Minimum	90	60	60	20	60	80
Maximum	300	300	300	200	276	300
Range	210	240	240	180	216	220

T –Test

Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	EOPEX	183.83	98	44.158	4.461
	ECAPEX	187.04	98	57.279	5.786
Pair 2	EOPEX	180.99	106	43.438	4.219
	COTEC	202.08	106	48.118	4.674
Pair 3	EOPEX	184.65	100	43.625	4.363
	PODET	118.60	100	44.609	4.461
Pair 4	EOPEX	183.62	87	41.990	4.502
	POPREV	209.38	87	47.111	5.051
Pair 5	EOPEX	183.67	90	41.966	4.424
	EEXTC	244.22	90	45.616	4.808
Pair 6	ECAPEX	183.47	95	57.367	5.886
	COTEC	204.76	95	50.634	5.195
Pair 7	ECAPEX	191.25	88	56.504	6.023
	PODET	117.27	88	47.288	5.041
Pair 8	ECAPEX	190.77	78	56.172	6.360
	POPREV	204.31	78	49.382	5.591
Pair 9	ECAPEX	188.35	79	55.803	6.278
	EEXTC	242.78	79	43.880	4.937
Pair 10	COTEC	199.81	103	50.959	5.021
	PODET	119.22	103	43.918	4.327
Pair 11	COTEC	201.49	91	50.928	5.339
	POPREV	207.43	91	47.909	5.022
Pair 12	COTEC	201.35	95	49.853	5.115
	EEXTC	243.37	95	44.497	4.565
Pair 13	PODET	121.43	98	43.577	4.402
	POPREV	206.20	98	48.838	4.933
Pair 14	PODET	120.40	101	43.998	4.378
	EEXTC	243.76	101	44.516	4.430
Pair 15	POPREV	207.91	89	46.256	4.903
	EEXTC	244.72	89	42.961	4.554

Paired Samples Correlation

		N	Correlation	Sig.
Paired 1	EOPEX & ECAPEX	98	.664	.000
Paired 2	EOPEX & COTEC	106	-.545	.000
Paired 3	EOPEX & PODET	100	-.531	.000
Paired 4	EOPEX & POPREV	87	-.505	.000
Paired 5	EOPEX & EEXTC	90	-.373	.000
Paired 6	ECAPEX & COTEC	95	-.640	.000
Paired 7	ECAPEX & PODET	88	-.512	.000
Paired 8	ECAPEX & POPREV	78	-.433	.000
Paired 9	ECAPEX & EEXTC	79	-.427	.000
Paired 10	COTEC & PODET	103	.627	.000
Paired 11	COTEC & POPREV	91	.605	.000
Paired 12	COTEC & EEXTC	95	.525	.000
Paired 13	PODET & POPREV	98	.581	.000
Paired 14	PODET & EEXTC	101	.530	.000
Paired 15	POPREV & EEXTC	89	.534	.000

Paired Samples Test

		Paired Differences				
					95% Confidence Interval of the Difference	
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Paired 1	EOPEX – ECAPEX	-3.21 -21.08	43.252 80.510	4.369 7.820	-11.89 -36.59	5.46 -5.58
Paired 2	EOPEX - COTEC	66.05	77.193	7.719	50.73	81.37
Paired 3	EOPEX - PODET	-25.76	77.338	8.291	-42.24	-.9.28
Paired 4	EOPEX - POPREV	-60.56	72.586	7.651	-75.76	-45.35
Paired 5	EOPEX - EEXTC					
Paired 6	ECAPEX – COTEC	-21.28 73.98	97.852 90.370	10.039 9.633	-41.22 54.83	-1.35 93.12
Paired 7	ECAPEX - PODET					
Paired 8	ECAPEX - POPREV	-13.54 -54.43	89.411 84.455	10.124 9.502	-33.70 -73.35	6.62 -35.51
Paired 9	ECAPEX - EEXTC	80.58	41.450	4.084	72.48	88.68

Paired 10	COTEC - PODET	-5.93	44.014	4.614	-15.10	3.23
Paired 11	COTEC - POPREV	-42.02	46.196	4.740	-51.43	-32.61
Paired 12	COTEC - EEXTC	-84.78	42.560	4.299	-93.31	-76.24
Paired 13	PODET - POPREV	-123.37	42.902	4.269	-131.84	-114.90
Paired 14	PODET - EEXTC	-36.81	43.158	4.575	-45.90	-27.72
Paired 15	POPREV – EEXTC					

Paired Samples Test

		T	Df	Sig.(2-tailed)
Paired 1	EOPEX – ECAPEX	-.736	97	.464
Paired 2	EOPEX - COTEC	-2.696	105	.008
Paired 3	EOPEX - PODET	8.556	99	.000
Paired 4	EOPEX - POPREV	-3.107	86	.003
Paired 5	EOPEX - EEXTC	-7.914	89	.000
Paired 6	ECAPEX – COTEC	-2.120	94	.037
Paired 7	ECAPEX - PODET	7.679	87	.000
Paired 8	ECAPEX - POPREV	-1.337	77	.185
Paired 9	ECAPEX - EEXTC	-5.728	78	.000
Paired 10	COTEC - PODET	19.730	102	.000
Paired 11	COTEC - POPREV	-1.286	90	.202
Paired 12	COTEC - EEXTC	-8.866	94	.000
Paired 13	PODET - POPREV	-19.719	97	.000
Paired 14	PODET - EEXTC	-28.899	100	.000
Paired 15	POPREV – EEXTC	-8.046	88	.000

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	369.60	348.072	75
EOPEX	175.40	43.973	75

Correlations

		EQR	EOPEX
Pearson Correlation	EQR	1.000	-.182
	EOPEX	-.182	1.000
Sig. (1-tailed)	EQR		.059
	EOPEX	.059	
N	EQR	75	75
	EOPEX	75	75

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EOPEX[a]	.	Entered

a. All requested variables entered
b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.182[a]	.033	.020	344.583

Predictors (Constant), EOPEX

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	297561.18	1	297561.177	2.506	.118[a]
	Residual	8667852.8	73	118737.710		
	Total	8965414.0	74			

Predictors (Constant), EOPEX
Dependent Variable: EQR

Coefficients[a]

Model	Unstandardized Coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant/Intercept)	622.539	164.660		3.781	.000
EOPEX	-1.442	.911	-.182	-1.583	.118

a. Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	375.74	328.990	68
ECAPEX	179.56	58.064	68

Correlations

		EQR	ECAPEX
Pearson Correlation	EQR	1.000	-.133

	ECAPEX	-.133	1.000
Sig. (1-tailed)	EQR	.	.140
	ECAPEX	.140	
N	EQR	68	68
	ECAPEX	68	68

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ECAPEX[a]	.	Entered

a. All requested variables entered
b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.133[a]	.018	.003	328.537

Predictors (Constant), ECAPEX

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	127876.91	1	127876.911	1.185	.280[a]
	Residual	7123828.3	66	107936.762		
	Total	7251703.2	67			

Predictors (Constant), ECAPEX
Dependent Variable: EQR

Coefficients[a]

	Unstandardized Coefficients		Standardized coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant/Intercept)	510.836	130.359		3.919	.000
ECAPEX	-.752	.691	-.133	-1.088	.280

Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	396.11	348.932	76
COTEC	207.95	48.374	76

Correlations

		EQR	COTEC
Pearson Correlation	EQR	1.000	.184
	COTEC	.184	1.000
Sig. (1-tailed)	EQR	.	.056
	COTEC	.056	
N	EQR	76	76
	COTEC	76	76

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	COTEC[a]	.	Entered

a. All requested variables entered
b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.184[a]	.034	.021	345.277

b. Predictors (Constant), COTEC

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	309545.92	1	309545.924	2.597	.111[a]
	Residual	8821985.2	74	119216.017		
	Total	9131531.2	75			

Predictors (Constant), COTEC
Dependent Variable: EQR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized coefficients		
		B	Std. Error	Beta	t	Sig.
1.	(Constant/Intercept)	119.938	175.904		.682	.497
	COTEC	1.328	.824	.184	1.611	.111

Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	331.81	285.171	72
PODET	123.06	44.993	72

Correlations

		EQR	PODET
Pearson Correlation	EQR	1.000	.076
	PODET	.076	1.000
Sig. (1-tailed)	EQR	.	.264
	PODET	.264	
N	EQR	72	72
	PODET	72	72

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PODET[a]	.	Entered

a. All requested variables entered

b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.076[a]	.006	-.009	286.381

Predictors (Constant), PODET

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32916.884	1	32916.884	.401	.528 [a]
	Residual	5740978.4	70	82013.977		
	Total	5773895.3	71			

Predictors (Constant), PODET

b. Dependent Variable: EQR

Coefficients [a]

Model		Unstandardized Coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant/Intercept)	272.916	98.893	.	2.760	.007
	PODET	.479	.755	.076	.634	.528

a. Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	329.83	290.116	64
POPREV	212.63	47.592	64

Correlations

		EQR	POPREV
Pearson Correlation	EQR	1.000	.005
	POPREV	.005	1.000
Sig. (1-tailed)	EQR		.483
	POPREV	.483	
N	EQR	64	64
	POPREV	64	64

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	POPREV[a]	.	Entered

a. All requested variables entered

b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.005[a]	.000	-.016	292.442

Predictors (Constant), POPREV

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	151.065	1	151.065	.002	.967[a]
	Residual	5302384.0	62	85522.323		
	Total	5302535.1	63			

Predictors (Constant), POPREV

b. Dependent Variable: EQR

Coefficients[a]

Model	Unstandardized Coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant/Intercept)	322.910	168.618		1.915	.060
POPREV	3.254E-02	.774	.005	.042	.967

Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	332.04	282.914	69
EEXTC	247.54	45.387	69

Correlations

		EQR	EEXTC
Pearson Correlation	EQR	1.000	-.060
	EEXTC	-.060	1.000
Sig. (1-tailed)	EQR		.313
	EEXTC	.313	
N	EQR	69	69
	EEXTC	69	69

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EEXTC[a]	.	Entered

a. All requested variables entered
b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.060[a]	.004	-.011	284.510

Predictors (Constant), EEXTC

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19364.475	1	19364.475	.239	.626[a]
	Residual	5423396.4	67	80946.215		
	Total	5442760.9	67			

Predictors (Constant), EEXTC
b. Dependent Variable: EQR

Coefficients[a]

Model	Unstandardized Coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant/Intercept)	424.078	191.260		2.217	.030
EEXTC	-.372	.760	-.060	-.489	.626

Dependent Variable, EQR

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
EQR	354.07	281.727	44
EOPEX	183.75	39.637	44
ECAPEX	186.82	55.981	44
COTEC	207.27	47.110	44
PODET	120.45	44.719	44
POPREV	207.27	49.738	44

EEXTC	241.36	48.875	44

Correlations

		EQR	EOPEX	ECAPEX	COTEC	PODET	POPREV	EEXTC
Pearson Correlation	EQR	1.000	-.207	-.086	.007	-.046	-.039	-.006
	EOPEX	-.207	1.000	.743	-.556	-.391	-.467	-.359
	ECAPEX	-.086	.743	1.000	-.650	-.542	-.435	-.386
	COTEC	.007	-.556	-.650	1.000	.654	.543	.517
	PODET	-.046	-.391	-.542	.654	1.000	.526	.591
	POPREV	-.039	-.467	-.435	.543	.526	1.000	.600
	EEXTC	-.006	-.359	-.386	.517	.591	.600	1.000
Sig. (1-tailed)	EQR	.	.089	.290	.481	.384	.400	.486
	EOPEX	.089	.	.000	.000	.004	.001	.008
	ECAPEX	.290	.000	.	.000	.000	.002	.005
	COTEC	.481	.000	.000	.	.000	.000	.000
	PODET	.384	.004	.000	.000	.	.000	.000
	POPREV	.400	.001	.002	.000	.000	.	.000
	EEXTC	.486	.008	.005	.000	.000	.000	
N	EQR	44	44	44	44	44	44	44
	EOPEX	44	44	44	44	44	44	44
	ECAPEX	44	44	44	44	44	44	44
	COTEC	44	44	44	44	44	44	44
	PODET	44	44	44	44	44	44	44
	POPREV	44	44	44	44	44	44	44
	EEXTC	44	44	44	44	44	44	44

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EOPEX ECAPEX [a] COTEC PODET POPREV EEXTC	.	Entered

a. All requested variables entered
b. Dependent Variable EQR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.278 [a]	.077	-.072	291.744

Predictors (Constant), EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	283681.00	6	43946.833	.516	.792 [a]
	Residual	3149239.8	37	85114.589		
	Total	3412920.8	43			

Predictors (Constant), EOPEX, ECAPEX, COTEC, PODET, POPREV, EEXTC

b. Dependent Variable: EQR

Coefficients [a]

Model	Unstandardized Coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant/Intercept)	984.811	511.187		1.927	.062
EOPEX	-.2.589	1.753	-.364	-1.477	.148
ECAPEX	.355	1.352	.071	.263	.794
COTEC	-.300	1.471	-.050	-.204	.840
PODET	-.425	1.482	-.067	-.287	.776
POPREV	-.795	1.228	-.140	-.647	.522
EEXTC	.235	1.251	.041	.188	.852

a. Dependent Variable, EQR

APPENDIX 11: BASES AND DESIGN OF ENVIRONMENTAL ACCOUNTING IN THE OIL AND GAS AND THE MANUFACTURING SECTORS IN NIGERIA

Quality of Reporting Score 3 – Environmental Quantitative/Monetary Content
2 – Environmental Descriptive Content
1 – Environmental Indicative Content
0 – No Environmental Reporting Content

Source 1) Annual Reports 2) Corporate Register Website for reporting Environment Policies

ENVIRONMENTAL REPORTING ANALYSIS FOR COMPANIES

PETROLEUM MARKETING	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
African Petroleum Plc	-									
	-									
	64	64	64	64	25	25	25	-	-	-
Chevron Oil Nigeria Plc	250	250	270	230	265	220	200			
	450	475	652	450	530	480	674	-	-	-
	-									
Conoil Plc	-									
	-									
	86	81	68	68	68	-	-			
Eternal Oil & Gas Plc	-	-								
	367	367	367	367	367					
Oando Plc	-									
	280	280	280	138	138	138	138	138	-	-
Total Nigeria Plc	-									
	-									
	119	119	119	119	119	58	58	58	-	-
THE FOREIGN LISTING	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
Texaco Overseas Petroleum Company Ltd.	-	-	-	-	-					
	107	107	143	143	135	140	73	73		
Mobil Oil Producing Company Unlimited	208	150	228	220	116	116	109			
	340	340	355	350	350	340	340			
Nigeria Agip Oil Company Limited								-		
								42		
Shell Petroleum Development Company	1380	1,086	344	305	305	269				
	3,036	4,075	771	750	771	771				
INDEGENOUS OIL COMPANIES NOT LISTED	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997

Dubril Oil Company Ltd.
Consolidated Oil Company Ltd.
Yinka Folawiyo Petroleum Ltd. - - - -
46 46 46
Cavendish Petroleum,
Amoco Nigeria Petroleum Company Ltd.
Pan Ocean Oil Corporation Ltd.
Ashland Petroleum Company
ConocoPhillip -
-
240 240 240 240
Addax Petroleum -
-
253 253 253 253

MANUFACTURING COMPANIES	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**	**1999**	**1998**	**1997**
Dunlop Nigeria Plc.	-	-	-							
	-	-	-							
	124	124	124	124						
Guinness Nigeria Plc.	-	-	-	-	-					
	45	45	45	45	45				67	67
Nigerian Breweries Plc.	-	-	-	-	-					
	220	220	200	200	200	-	-	-	-	-
	40	40	30	27						
Ashaka Cement Plc.	-									
	508	503	503	503	503	503	503	503	503	-
West Africa Portland Company Plc.	86	86	86	86	86					
	-	-	-	-	-					
	-	-	-	-	-					
Berger Paints Plc.	50	50	40	40	40	40				
	240	240	240	240	210	210	-	-	-	-
CAP Plc.	-	-	-	-	-	-				
	135	135	135	135	135	-	-	-	-	-
	-	-	-							
SCOA Nigeria Plc.	-									
	-	-								
	45	45	45	45	45	-	-	-	-	
Unilever Nig. Plc.	-	-	-	-	-	-	-	-	-	-
	129	129	129	129	129	167	156	180	182	
7 Up Bottling Company Plc.	-	-								
	-	-	-	-	-	-	-	-	-	-
	37	37	37	37	-	-	-	-	-	-
Cadbury Nigeria Plc.	-	-								
	372	325	325	325	325	325	95	70	70	
	-	-								
Flour Mills Nig. Plc.	-	-	-	-	-	-				
	50	50	50	50	-	-	-	-	-	-
		-								
Nestle Nig. Plc.	1,180	1,180	1020	980	980	980				
	2,550	2,550	2,255	2,250	2,250	2,250				
	-	-	-	-	-	-	-	-	-	

GlaxoSmithkline Consumer Nig. Plc.	780	750	750	730						
	2,260	2,200	2,000	2,080						
	-	-	-	-	-					
Neimeth International Pharm. Plc.	-									
	-									
	26	26	26	26	-	-	-	-	-	-

APPENDIX 12: COMPANIES' RESPONSE TO QUESTIONNAIRES ADMINISTERED

Two categories of questionnaires were administered, namely those targeted at manufacturing and oil and gas operating corporate organizations, and the second batch targeted at Government Departments and other Agencies considered as Environmental Policies Regulatory Bodies. In the latter category is also include those considered as stakeholders in environmental issues.

Category 1 Questionnaires – Manufacturing and the Oil & Gas Sectors

Returned Questionnaires

Administered Questionnaires	Frequency (No. of Respondents)	Proportion (%)
No. Returned	183	26%
No. Not Returned	517	74%
Total	**700**	**100%**

Number of questionnaires returned were 183 (26%) of 700 questionnaires given out for primary survey. This is a fair representation considering the unwillingness of corporate organizations to give out sensitive information such as have to do with their activities, practice and performance. This is one of the critical constraints encountered in this study.

Highest Educational Qualification of Respondent

Highest Education	Frequency (No. of Respondents)	Proportion (%)

Below University Degree	5	2.7%
University Degree/HND	65	35.5%
Post Grad. Degree/Professional	113	61.8%
Total	**183**	**100%**

An insignificant 2.7% of those who filled out the questionnaires held qualifications below university degrees. Consequently, over 97% have good education to grasp the importance of the issue of environment at stake. Besides, 61.8% of the respondents constitute highly experienced professional managers in the organizations who also have post graduate degrees.

Organizational Sectors of Respondents

Sector	**Frequency (No. of Respondents)**	**Proportion (%)**
Oil & Gas	58	31.7%
Manufacturing	125	68.3%
Total	**183**	**100%**

COMPANY ENVIRONMENTAL REPORTING –Frequencies
Frequency Tables

1. To what extent does your company generate environmental cost information?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very	4	5.6	5.6	5.6
	High	32	45.1	45.1	50.7
	Neither high nor low	11	15.5	15.5	66.2
	Low	16	22.5	22.5	88.7
	Very low	8	11.3	11.3	100.0
	Total	71	100.0	100.0	

Source: Researcher's Survey, 2008

Whereas almost 5.6% considers very high the level of environmental reporting in their organizations, 56.3% consider that environmental issues are being accounted for. Field response does not correspond with Annual Report of average of only 6.6%, which is the evidence of environmental reporting. Two possible explanatory reasons may be tenable, firstly

that environmental costing may be generated by these companies but that these do not find their way into financial reporting. This may be as a result of the non-standardization for reporting environmental costs at the moment. A second reason may be that whereas, these costs are normally not generated, but it is characteristic of company management to cover up on deficiencies as a way of hiding sensitive information in companies. Either way, environmental costing system and Environmental Management System is yet developed only at a low level.

2. Which of the following statements best describes how you generate this information?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid i)Generated as part of your general ledger system	30	42.3	42.3	42.1
ii)Generated as part of your management accounting system separate from your general system	14	19.7	19.7	62.0
iii)Generated by a free standing system using data electronically transferred from general ledger or management accounting system	4	5.6	5.6	67.6
iv) Generated by a free standing system which does not directly access data in other systems, including non-automated methods	5	7.0	7.0	74.6
v) Generated by some other type of system	18	25.4	25.4	100.0
Total	71	100.0	100.0	

Source: Researcher's Survey, 2008

42.3% respond that environmental accounting is generated as part of general ledger system while 19.7% states that they are generated as part of management accounting system, separate from general ledger system. About 5.6% states that the data and information are generated by free standing system.

3. Who are the recipients of the information?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Account Dept. only	7	9.9	10.3	10.3
	Management Accounting System	4	5.6	5.9	16.2
	Environmental only	6	8.5	8.8	25.0
	Corporate Dept only	21	29.6	30.9	55.9
	Corporate & Environment	4	5.6	5.9	61.8
	Mgt. Account & Account Dept	26	36.6	38.2	100.0
	Environment, Corporate, Plant & Accounts	68	95.8	100.0	
	No Response	3	4.2		
	Total	71	100		

Source: Researcher's Survey, 2008

Majority (95.8%) says that environmental cost information and reports which are generated are received by Environment, Corporate and plant accounts units of the organizations. What department or unit that receives environmental reports is not as important as to what relevance and use these data and information are put into. Suffice to assure that these data are received in order to further attest to the fact that these data and information are generated and whether they are disclosed in Annual Re[ports of the companies.

4. What internal barriers affect the ability of the company to collect environmental costs information?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Absence of classification of costs on environmental bases	25	35.2	36.8	36.8
	Training in Envir. Accounting is yet to take place	26	36.6	38.2	75.0
	Envir. Accounting is yet to be enforce	12	16.9	17.6	92.6
	Others (Specify)	5	7.0	7.4	100.0
	Total Response	68	95.8	100.0	
	No Response	3	4.2		
	Total	71	100.0		

Source: Researcher's Survey, 2008

Two major barriers which are claimed to affect the ability of companies to collect environmental cost information are absence of classification of costs on environmental bases (35.2%) and lack of training in Environmental. Accounting (36.6%). The question on barrier and response might be a candid acid test to the generation of environmental accounting information or otherwise. The response is rightly made that most employing companies have no thorough awareness of environmental accounting and have not therefore, trained their employees on this emerging and important environmental issues.

5. To what level does the company make estimates of the less tangible environmental costs or benefits such as liabilities from past operations, the indirect cost of regulation, the benefit of environmental pro-activity etc/

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very High	2	2.8	2.8	2.8
	High	13	18.3	18.3	21.1
	Neither high nor low	33	46.5	46.5	67.6
	Low	13	18.3	18.3	85.9
	Very low	10	14.1	14.1	100.0
	Total	71	100.0	100.0	

Source: Researcher's Survey, 2008

21.1% responds affirmative to the question on companies making estimates of the less tangible environmental costs or benefits. 88.9% respondents are truly not aware of what environmental accounting is all about.

6. To what extent are environmental operating expenditure tracked independently of other operating expenditure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very High	2	2.8	2.9	2.9
	High	14	19.7	20.0	22.9
	Neither high nor low	28	39.4	40.0	62.9
	Low	20	28.2	28.6	91.4
	Very low	6	8.5	8.6	100.0

	Total Response	70	98.6	100.0	
	No Response	1	1.4		
	Total	71	100.0		

Source: Researcher's Survey, 2008

About 23% responds affirmatively that environmental operating expenditures are tracked independently of other operating expenditure, while 77% responds as low or probably ignorant of what environmental operating costs and benefits really are.

7. To what extent do these techniques differ from those used to evaluate non-environmental projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very High	8	11.3	12.7	12.7
	High	13	18.3	20.6	33.3
	Neither high nor low	26	36.6	41.3	74.6
	Low	14	19.7	22.2	96.8
	Very low	2	2.8	3.2	100.0
	Total Response	63	88.7	100.0	
	No Response	8	11.3		
	Total	71	100.0		

Source: Researcher's Survey, 2008

About 33.3% responds affirmatively that techniques differ from those used to evaluate non-environmental projects, while 66.7% responds as low or probably ignorant of the issues at stake.

8. To what extent are environmental capital expenditure tracked independently?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very High	5	7.0	8.9	8.9
	High	9	12.7	16.1	25.0
	Neither high nor low	22	31.0	39.3	64.3
	Low	15	21.1	26.8	91.1
	Very low	5	7.0	8.9	100.0
	Total Response	56	78.9	100.0	

No Response	15	21.1		
Total	71	100.0		

Source: Researcher's Survey, 2008

25% responds very high and high to the issue of whether environmental capital expenditures are tracked independently or not while 75% has responded either low or that they are ignorant of environmental issues altogether.

9. What division decides whether a project should be classified as environment?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Corporate only	14	19.7	19.7	19.7
	Management/Financial Accounting only	23	32.4	32.4	52.1
	Environment & Corporate	9	12.7	12.7	64.8
	Plant & Environment	6	8.5	8.5	73.2
	Envir. Corporate, Plant & Accounting	19	26.8	26.8	100.0
	Total	71	100.0	100.0	

Source: Researcher's Survey, 2008

Since Environmental Accounting and Environmental Management System generally, transcends beyond the confines of the accounting unit or function, this question is meant to elicit the involvement of other functional units or departments in the entire company.

The field response from the spread of the various department or functions involved however states a positive development on spread of awareness of Environmental Management System.

10. Level at which environmental capital budgeting occurs

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Corporate only	17	23.9	24.3	24.3
	Environment only	2	2.8	2.9	27.1
	Plant only	4	5.6	5.7	32.9
	Management/Financial Accounting only	26	36.6	37.1	70.0
	Plant & Environment	2	2.8	2.9	72.9
	Envir. Corporate, Plant & Accounting	19	26.8	27.1	100.0
	Total Response	70	98.6	100.0	
	No Response	1	1.4		
	Total	71	100.0		

Source: Researcher's Survey, 2008

27.1% Respondents admit that capital budgeting occurs at the Environment, Corporate, Plant & Accounts Units. Also, 37.1% admit that it occurs at Management/Financial Accounting Departments.

11. When financial analysis of capital environmental expenditure is performed, how significantly are numerical estimates included for intangibles such as goodwill, improved community or employee relations, fines and penalties?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very High	4	5.6	6.0	6.0
	High	10	14.1	14.9	20.9
	Neither high nor low	35	49.3	52.2	73.1
	Low	13	18.3	19.4	92.5
	Very low	5	7.0	7.5	100.0
	Total Response	67	94.4	100.0	
	No Response	4	5.6		
	Total	71	100.0		

Source: Researcher's Survey, 2008

Almost 30% responds very high and high to the question. This appears impressive, but one wonders if respondents truly sincere in understanding the implication of the question considering that many employees do not yet have awareness and technical training on environmental accounting and environmental management system.

12. What techniques are used to evaluate the feasibility of environmental projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Profitability Index	20	28.2	35.7	35.7
	Return on Total Assets	19	26.8	33.9	69.6
	NPV	8	11.3	14.3	83.9
	IRR	2	2.8	3.6	87.5
	Payback	7	9.9	12.5	100.0
	Total Response	56	78.9	100.0	
	No Response	15	21.1		
	Total	71	100.0		

Source: Researcher's Survey, 2008

35.7% officials say that the technique of Profitability Index is used to evaluate the feasibility of environmental projects in their companies while 33.95 claim it is Return on Total Assets. This response is specific enough if only it is genuine.

Questions 14- 29, Respondents' Applicable Weights as follows:

a.) Very high = 5 b.) High = 4 c,) Neither High nor Low = 3 d.) Low = 2 e.) Very low = 1

Table 4.5a Respondents Frequency Statistics

	Score	**5**	**4**	**3**	**2**	**1**	**Total**
	SECTION C: TECHNOLOGY FOR PRODUCT CONTENT AND POLICIES						
14	To what extent are estimates of current environmental costs utilized in new process design and technology decisions?	9 10.1%	16 18.0%	38 42.7%	9 10.1%	17 19.1%	**89** **100%**
15	To what extent are estimates of future environmental costs utilized in new process design and technology decisions?	14 14.9%	30 31.1%	32 34.0%	5 5.3%	13 13.8%	**94** **100%**
16	To what extent does the company adopt 'cleaner' technologies or methods that exceed requirement?	18 18.8%	41 42.7%	16 16.7%	16 16.7%	5 5.2%	**96**
17	To what extent does the company adopt 'cleaner' technologies or methods before they are required?	8 9.0%	45 50.6%	18 20.2%	9 10.1%	9 10.1%	**89** **100%**
18	To what extent does the company participate in voluntary environmental programmes?	15 16.9%	34 38.2%	21 23.6%	11 12.3%	8 9.0%	**89** **100%**
	SECTION D: ENVIRONMENTAL FAILURE COSTS, POLLUTION DETECTION AND PREVENTION						
19	To what extent would the company revise estimates of past liability as part of a periodic review process?	4 4.3%	42 46.2%	31 34.1%	3 3.3%	11 12.1%	**91** **100%**

20	To what extent would the company revise estimates of past liability based on anticipated changes in regulations?	9 10.0%	39 43.3%	20 22.2%	8 8.9%	14 15.6%	**90** **100%**
21	To what extent are there words of disclosure on environmental issues including energy conservation in financial reports?	3 3.3%	34 37.8%	14 15.6%	15 16.7%	24 26.6%	**90** **100%**
	Procurement Services						
22	To what extent do you have in place Environmental Policy Statements which are also meant to affect prospective contractors and invitation to tender procurements?	35 40.0%	22 25%	16 18.1%	7 7.9%	8 9.0%	**88** **100%**
23	To what extent does your organization ensure that their personnel and contractors maintain full awareness of relevant elements of the operators Environmental Policy Documentation?	44 45.8%	13 13.5%	25 26.1%	7 7.3%	7 7.3%	**96** **100%**
	Waste Management						
24	To what extent is your company able to clearly identify wastes where appropriate which should be stored in such a way to prevent: a. Corrosion or wear of waste containers b. Accidental spillage or leakage c. Accident or weather breaking containers, exposing waste and allowing it to escape d. Removal by unauthorized parties	61 53.7%	38 33.6%	14 12.7%	-	-	**114** **100%**
25	To what extent is your company in a position to ensure that controlled waste is transported only by carrier registered under the Control of Pollution (Amendment) Act 1989?	59 51.9%	55 48.1%	-	-	-	**114** **100%**
26	To what extent is your company able to effect that Controlled wastes are only disposed of to sites licensed under the 1990 Environmental Protection Act?	49 45.1%	28 26.3%	14 13.4%	11 10.0%	6 5.2%	**108** **100%**
	Pollution Prevention						
27	To what extent is your company able to continue to reduce the impact of crude oil on the environment and seek to prevent any new significant pollution?	29 26.2%	15 13.1%	21 19.2%	13 11.5%	33 30.0%	**111** **100%**
28	In all honesty, to what extent do you consider that costs classifications in companies/corporations strictly reflect environmental costs in Nigeria?	-	21 18.2%	63 55.4%	4 3.9%	26 22.5%	**114** **100%**
29	To what extent do you consider that policy regulations on environment in Nigeria adequate?	-	29 27.9%	44 42.6%	25 24.0%	6 5.5%	**104** **100%**

Source: Researcher's Survey, 2008

Only 28% of respondents admit high consideration for environmental costs influence on technology for product content and policies in the areas of new process design and cleaner technology. But 61.7% admit high consideration for 'cleaner' technologies on the environment. About 55% admit that companies participate in voluntary environmental programmes. This is truly so, because the State Regulatory Agency for environmental programmes does enforce compliance from time to time.

Questions 19 – 21 touch on accounting for the Externalities. The responses to these questions seem high 40% to 53% which signify that company account for externalities. This will only be impressive if this is genuine and not a cover-up of companies managers as corporate secrets. Also, 40 – 45.8% have Environmental Policies statements for procurement contractors and 53.4% actively participate in Pollution Prevention and Waste Management.

CATEGORY 2 QUESTIONNAIRES – ENVIRONMENTAL POLICY REGULATORS
Federal Ministry of Environment (FMEnv), Department of Petroleum Resources (DPR), Bayelsa State Ministry of Environment (SMEnv, Bayelsa State Ministry of Energy (SMEnerg), Pollution Control Department of Nigeria Ports Authority (NPA) and Nigerian Accounting Standards Board (NASB)

SECTION A: PERSONAL INFORMATION

Returned Questionnaires

Administered Questionnaires	No. of Respondents	Proportion (%)
No. Returned	76	47.5%
No. Not Returned	84	52.5%
Total	**160**	**100%**

Of the 160 questionnaires distributed to the officials of Environmental Regulating Agencies, 76 (47.5%) responded through returned questionnaires.

Highest Educational Qualification of Respondent

Highest Education	No. of Respondent	Proportion (%)
Below University Degree	5	6.6%
University Degree/HND	24	31.5%
Post Grad. Degree/Professional	47	61.9%
Total	**76**	**100%**

The caliber of respondents is high in the operating companies as 93% are University and Polytechnic graduates among which almost 62% are highly experienced and post graduate workers.

Organizational Sectors of Respondents

Sector	No. of Respondent	Proportion (%)
Federal Ministries/Departments (Environment)	58	76.3%
State Ministries/Departments (Environment)	7	9.2%
Other Agencies (NASB)	11	14.5%
Total	**76**	**100%**

Over 85% of Environmental Regulatory Agencies are the Federal and States governments Departments and Agencies

SECTION B: RESEARCH INFORMATION

ENVIRONMETAL REGULATORY AGENCIES ASSESSMENT –Frequencies

1. Does your organization participate in regulating / implementing environmental policies in Nigeria?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	79.1	82.9	82.9
	Sometimes	1	2.3	2.4	85.4
	Not our mandate	6	14.0	14.6	100.0
	Total Response	41	95.3	100.0	
	No Response	2	4.7		
	Total	43	100.0		

2. Do you require the project operator to demonstrate that due consideration is given to the need to comply with relevant legal requirement?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	79.1	82.9	82.9
	Sometimes	3	7.0	7.3	90.2
	No	2	4.7	4.9	95.1
	Not our mandate	2	4.7	4.9	100.0
	Total Response	41	95.3	100.0	
	No Response	2	4.7		
	Total	43	100.0		

3. Does your organization communicate to applicant potential of environmental problem when considering application?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	51.2	55.0	55.0
	Sometimes	8	18.6	20.0	75.0
	No	4	9.3	10.0	85.0
	Not our mandate	6	14.0	15.0	100.0
	Total Response	40	93.0	100.0	
	No Response	3	7.0		
	Total	43	100.0		

4. Do you undertake site inspection of all applicants/operators projects to record and check the effectiveness of site management and identify any required action?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	26	60.5	63.4	63.4
	Sometimes	8	18.6	19.5	82.9
	No	1	2.3	2.4	85.4
	Not our mandate	6	14.0	14.6	100.0
	Total Response	41	95.3	100.0	
	No Response	2	4.7		
	Total	43	100.0		

5. How regular?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quarter	7	16.3	21.2	21.2
	Bi-annual	1	2.3	3.0	24.2
	Annual	1	2.3	3.0	27.3
	Others specify (please)	24	55.8	72.7	100.0
	Total Response	33	76.7	100.0	
	No Response	10	23.3		
	Total	43	100.0		

6. In permanent cessation of project, do you liaise with operators to ensure that they address all residual environmental issues associated with the operations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30.	69.8	71.4	71.4
	Sometimes	5	11.6	11.9	83.3
	Not our mandate	1	2.3	2.4	85.7
	Total Response	6	14.0	14.3	100.0
	No Response	42	97.7	100.0	
	Total	1	2.3		
		43	100.0		

7. Do you ensure that project operators address issues relating to future pollution on the abandonment of the project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	58.1	59.5	59.5
	Sometimes	8	18.6	19.0	78.6
	No	1	2.3	2.4	81.0
	Not our mandate	8	18.6	19.0	100.0
	Total Response	42	97.7	100.0	
	No Response	1	2.3		
	Total	43	100.0		

8. Does your Department/Organization ensure that suitably qualified consultants are appointed to undertake an environmental impact assessment (EIA) associated with a particular project? Are the EIAs communicated to your organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	74.4	74.4	74.4
	Sometimes	3	7.0	7.0	81.4
	No	2	4.7	4.7	86.0
	Not our mandate	6	14.0	14.0	100.0
	Total	43	100.0	100.0	

9. Do you regulate project operators on choice of technology and impact on the environment?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	58.1	58.1	58.1
	Sometimes	6	14.0	14.0	72.1
	Not our mandate	2	4.7	4.7	76.7
	Total	10	23.3	23.3	100.0
		43	100.0	100.0	

10. Do you regulate project operators on implementation of projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	55.8	57.1	57.1
	Sometimes	8	18.6	19.0	76.2
	Not our mandate	10	23.3	23.8	100.0
	Total Response	42	97.7	100.0	
	No Response	1	2.3		
	Total	43	100.0		

11. Do you ensure compliance of operators to any environmental legislation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	31	72.1	77.5	77.5
	Sometimes	3	7.0	7.5	85.0
	Not our mandate	6	14.0	15.0	100.0
	Total Response	40	93.0	100.0	

	No Response	3	7.0		
	Total	43	100.0		

12. Do you regularly review the findings of the original EIA and take measures to minimize environmental problems?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	29	67.4	70.7	70.7
	Sometimes	6	14.0	14.6	85.4
	Not our mandate	6	14.0	14.6	100.0
	Total Response	41	95.3	100.0	
	No Response	2	4.7		
	Total	43	100.0		

13. Do you ensure that operators have in place environmental policy statements which are also meant to affect prospective contractors and invitation to tender procurement?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	51.2	57.9	57.9
	Sometimes	2	4.7	5.3	63.2
	No	2	4.7	5.3	68.4
	Not our mandate	12	27.9	31.6	100.0
	Total Response	38	88.4	100.0	
	No Response	5	11.6		
	Total	43	100.0		

14. Does your organization ensure that the operators ensure that their personnel and contractors maintain full awareness of relevant elements of the operators environmental policy documentation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	53.5	59.0	59.0
	Sometimes	2	4.7	5.1	64.1
	No	2	4.7	5.1	69.2
	Not our mandate	12	27.9	30.8	100.0
	Total Response	39	90.7	100.0	
	No Response	4	9.3		
	Total	43	100.0		

15. Is your department /organization able to clearly identify operators' waste where appropriate which should be stored in such a way to prevent: a) corrosion or wear of waste containers? b) accidental spillage or leakage, etc.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	69.8	75.0	75.0
	Sometimes	5	11.6	12.5	87.5
	No	1	2.3	2.5	90.0
	Not our mandate	4	9.3	10.0	100.0
	Total Response	40	93.0	100.0	
	No Response	3	7.0		
	Total	43	100.0		

16. Is your department in a position to ensure that controlled waste is transported only by carrier registered under the control of pollution (amendment) act of 1989?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	19	44.2		
	Sometimes	10	23.3		
	No	6	14.0		
	Not our mandate	6	14.0		
	Total Response	41	95.3		
	No Response	2	4.7		
	Total	43	100.0		

17. Is your department /organization able to effect that controlled waste are only disposed of to site licensed under the 1990 environmental protection act?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	48.8	53.8	53.8
	Sometimes	8	18.6	20.5	74.4
	No	4	9.3	10.3	84.6
	Not our mandate	6	14.0	15.4	100.0
	Total Response	39	90.7	100.0	
	No Response	4	9.3		
	Total	43	100.0		

18. Is your department /organization able to continue to reduce the impact of crude oil on the environment and seek to prevent any new significant pollution?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	51.2	52.4	52.4
	Sometimes	9	20.9	21.4	73.8
	No	4	9.3	9.5	83.3
	Not our mandate	7	16.3	16.7	100.0
	Total Response	42	97.7	100.0	
	No Response	1	2.3		
	Total	43	100.0		

19. Is your department /organization able to maintain a programme for monitoring crude oil spillage at surface and below water in offshore?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	55.8	58.5	58.5
	Sometimes	5	11.6	12.2	70.7
	No	5	11.6	12.2	82.9
	Not our mandate	7	16.3	17.1	100.0
	Total Response	41	95.3	100.0	
	No Response	2	4.7		
	Total	43	100.0		

20. In all honesty, do you consider that costs classifications in the upstream sector strictly reflect environmental costs in Nigeria?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	14.0	17.1	17.1
	Sometimes	7	16.3	20.0	37.1
	No	16	37.2	45.7	82.9
	Not our mandate	6	14.0	17.1	100.0
	Total Response	35	81.4	100.0	
	No Response	8	18.6		
	Total	43	100.0		

21. Are policy regulations on environment in Nigeria adequate?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	25.6	29.7	29.7
	Sometimes	7	16.3	18.9	48.6
	No	19	44.2	51.4	100.0
	Total Response	37	86.0	100.0	
	No Response	6	14.0		
	Total	43	100.0		

22. Is environmental costs development in Nigeria attaining prescribed standards?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	14.0	15.4	15.4
	Sometimes	8	18.6	20.5	35.9
	No	23	53.5	59.0	94.9
	Not our mandate	2	4.7	5.1	100.0
	Total Response	39	90.7	100.0	
	No Response	4	9.3		
	Total	43	100.0		

23. Is the oil sector in Nigeria pursuing environmental degradation and pollution prevention?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	53.5	57.5	57.5
	Sometimes	11	25.6	27.5	85.0
	No	6	14.0	15.0	100.0
	Not our mandate	40	93.0	100.0	
	Total Response	3	7.0		
	No Response	43	100.0		
	Total				

APPENDIX 13: RESEARCH QUESTIONNAIRE FOR Ph.D. THESIS

Dear Valued Respondent,

DESIGN AND BASES OF ENVIRONMENTAL ACCOUNTING IN NIGERIA

This questionnaire is designed strictly for purpose of academic research only, at the Post Graduate level at the Covenant University, Ota, Nigeria. The study is for developing environmental accounting aimed at enhancing eco-efficiency in the Nigerian environment. It is hoped that the outcome of the research will be beneficial to the Nigerian environment and economy.

Thank you for your kind response and participation in this study.

John A. Enahoro, (Doctoral. Candidate)
Covenant University

PERSONAL INFORMATION

1. Gender: Male ( ) Female ( )
2. Highest Qualification (and Professional qualification, if any): _____
3. Status in your company and Department: _____
4 Company name: _____
5. Sector:_____

RESEARCH INFORMATION

SECTION A: ENVIRONMENTAL OPERATING EXPENDITURE

1 To what extent does your company generate environmental cost information?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

2.Which of the following statements (a - e) best describe how you generate this information:

a.) Generated as part of your general ledger system.

b.) Generated as part of your management accounting system, separate from your general ledger system.

c.) Generated by a free standing system, using data electronically transferred from your general ledger or management accounting system.

d.) Generated by a free standing system, which does not directly access data in other systems, including non-automated methods.

e.) Generated by some other type of system.

3.) Who are the recipients of the information?

a.) Accounts Dept. only b.) Management Accounting system c.) Environmental only d.) Corporate Dept only e.) Corporate & Environment f.) Mgt. Accounts & Accts. Dept g) Environment, Corporate, Plant & Accounts

4) What internal barriers affect the ability of the company to collect environmental cost information?

a.) Absence of classification of costs on environmental bases b.) Training in Envir. Accounting is yet to take place c.) Envir. Accounting is yet to be enforced. d.) Others (Specify please)

5. To what level does the company make estimates of the less tangible environmental costs or benefits such as liabilities from past operations, the indirect cost of regulation, the benefit of environmental pro-activity, etc?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

6.) To what extent are environmental operating expenditures tracked independently of other operating expenditure?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

7.) To what extent do these techniques differ from those used to evaluate non-environmental projects?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

SECTION B: ENVIRONMENTAL COST ACCOUNTING SYSTEM

8.) To what extent are environmental capital expenditures tracked independently ?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

9.) What division decides whether a project should be classified as environmental?

a.) Corporate only b.) Environment only c) Plant only

d.) Management/Financial Accounting only e.) Environment & Corporate

f.) Plant & Environment g.) Environment, Corporate, Environment & Accounting

10). Level at which capital budgeting occurs

a.) Corporate only b.) Environment only c) Plant only

d.) Management/Financial Accounting only e.) Environment & Corporate

f.) Plant & Environment g.) Environment, Corporate, Plant & Accounting

11) When financial analysis of capital environmental expenditure is performed, how significantly are numerical estimates included for intangibles such as goodwill, improved community or employee relations, fines and penalties?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

12). What techniques are used to evaluate the feasibility of environmental projects?

a.) Profitability Index b.) Return on Total Assets c.) NPV d.) IRR

e.) Payback f.) ROI

13) .List three most significant difficulties the company faces in attempting to remain in compliance with regulation:

i.

ii.

iii.

On the attached table, kindly respond to the extent or level of reasonable applicability as:

a.) Very high = 5 b.) High = 4 c,) Neither High nor Low = 3 d.) Low = 2 e.) Very low = 1

		5	4	3	2	1
	SECTION C: TECHNOLOGY FOR PRODUCT CONTENT AND POLICIES					
14	To what extent are estimates of current environmental costs utilized in new process design and technology decisions?					
15	To what extent are estimates of future environmental costs utilized in new process design and technology decisions?					
16	To what extent does the company adopt 'cleaner' technologies or methods that exceed requirement?					
17	To what extent does the company adopt 'cleaner' technologies or methods before they are required?					
18	To what extent does the company participate in voluntary environmental programmes?					
	SECTION D: ENVIRONMENTAL FAILURE COSTS, POLLUTION DETECTION AND PREVENTION					
19	To what extent would the company revise estimates of past liability as part of a periodic review process?					
20	To what extent would the company revise estimates of past liability based on anticipated changes in regulations?					
21	To what extent are there words of disclosure on environmental issues including energy conservation in financial reports?					
	Procurement Services					
22	To what extent do you have in place Environmental Policy Statements which are also meant to affect prospective contractors and invitation to tender procurements?					
23	To what extent does your organization ensure that their personnel and contractors maintain full awareness of relevant elements of the operators Environmental Policy Documentation?					
	Waste Management					
24	To what extent is your company able to clearly identify wastes where appropriate which should be stored in such a way to prevent: Corrosion or wear of waste containers Accidental spillage or leakage Accident or weather breaking containers, exposing waste and allowing it to escape d. Removal by unauthorized parties					
25	To what extent is your company in a position to ensure that controlled waste is transported only by carrier registered under the Control of Pollution (Amendment) Act 1989?					
26	To what extent is your company able to effect that Controlled wastes are only disposed of to sites licensed under the 1990 Environmental Protection Act?					
	Pollution Prevention					

27	To what extent is your company able to continue to reduce the impact of crude oil on the environment and seek to prevent any new significant pollution?					
28	In all honesty, to what extent do you consider that costs classifications in companies/corporations strictly reflect environmental costs in Nigeria?					
29	To what extent do you consider that policy regulations on environment in Nigeria adequate?					

Thank you most sincerely.

APPENDIX 14: QUESTIONNAIRE FOR POLICY REGULATORS – Federal Ministry of Environment, Department of Petroleum Resources, Nigerian Accounting Standards Board, etc.)

DESIGN AND BASES OF ENVIRONMENTAL ACCOUNTING IN NIGERIA

RESEARCH QUESTIONNAIRE PH.D THESIS

SECTION A: PERSONAL INFORMATION

1. Gender: Male ( ) Female ( )

2. Highest Qualification (and Professional qualification, if any): _____

_____

3. Status in your company and Department: _____

4. Name of Government Department/Agency----------

SECTION B: RESEARCH INFORMATION

1 Does your organization participate in regulating/implementing environmental policies in Nigeria?

a) Yes b.) Sometimes c) No d.) Not our mandate

2. Please, list other government departments/agencies apart from yours which are known to be saddled with Environmental Control responsibilities

.

3. Do you require the project operator to demonstrate that due consideration is given to the need to comply with relevant legal requirement?

a) Yes b.) Sometimes c) No d.) Not our mandate

4. To what extent do require that there be words of disclosure on environmental issues including energy conservation in financial reports of operators?

a.) Very high b.) High c,) Neither High nor Low d.) Low e.) Very low

5.Does your organization communicate to applicant potential of environmental problem when considering application?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you undertake site inspection of all applicants/operators' projects to record and check the effectiveness of site management and identify any required action?

a) Yes b.) Sometimes c) No d.) Not our mandate

How regular? a) Quarter b.) Bi-annual c) annual d.) (others), specify please----------

Do you require operators to remit reports to your department/organization on annual or other regular basis?.

Please specify what reports.

In permanent cessation of project, do you liaise with operators to ensure that they address all residual environmental issues associated with that operation?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you ensure that project operators address issues relating to future pollution on the abandonment of the project?

a) Yes b.) Sometimes c) No d.) Not our mandate

Major Projects.

Does your department/organisation ensure that suitably qualified consultants are appointed to undertake an Environmental Impact Assessment (EIA) associated with a particular project? Are the EIAs communicated to your organization?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you regulate project operators on choice of technology and impact on the environment?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you regulate project operators on implementation of projects?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you ensure compliance of operators to any environmental legislation?

a) Yes b.) Sometimes c) No d.) Not our mandate

Do you regularly review the findings of the original EIA and take measures to minimize environmental problems?

a) Yes b.) Sometimes c) No d.) Not our mandate

Procurement Services

Do you ensure that operators have in place Environmental Policy Statements which are also meant to affect prospective contractors and invitation to tender procurements?

a) Yes b.) Sometimes c) No d.) Not our mandate

Does your organization ensure that the operators ensure that their personnel and contractors maintain full awareness of relevant elements of the operators Environmental Policy Documentation?

a) Yes b.) Sometimes c) No d.) Not our mandate

Waste Management

16. Is your department/organisation able to clearly identify operators' wastes where appropriate which should be stored in such a way to prevent:

Corrosion or wear of waste containers

Accidental spillage or leakage

Accident or weather breaking containers, exposing waste and allowing it to escape

Removal by unauthorized parties

a) Yes b.) Sometimes c) No d.) Not our mandate

17. Is your department in a position to ensure that controlled waste is transported only by carrier registered under the Control of Pollution (Amendment) Act 1989?

a) Yes b.) Sometimes c) No d.) Not our mandate

18. Is your department/organization able to effect that Controlled wastes are only disposed of to site licensed under the 1990 Environmental Protection Act?

a) Yes b.) Sometimes c) No d.) Not our mandate

Pollution Prevention

19. Is your department/organization able to continue to reduce the impact of crude oil on the environment and seek to prevent any new significant pollution?

a) Yes b.) Sometimes c) No d.) Not our mandate

20. Is your department/organization able to maintain a programme for monitoring crude oil spillage at surface and below water in offshore?

a) Yes b.) Sometimes c) No d.) Not our mandate

21. To what extent would you consider that your department/organization is adequately prepared for it's assignment? Please rank in the order of 1 – 5 possible capacity available in your organization, (1) being the highest ranking:
    i. Statutory Empowerment for control
    ii. Research & Development capacity
    iii. Funding for monitoring
    iv. Others (Please specify)

14. In all honesty, do you consider that costs classifications in the upstream sector strictly reflect environmental costs in Nigeria?
    a) Yes b.) Sometimes c) No d.) Not our mandate

15. Are policy regulations on environment in Nigeria adequate?
    a) Yes b.) Sometimes c) No d.) Not our mandate

16. Is environmental costs development in Nigeria attaining prescribed standards?
    a) Yes b.) Sometimes c) No d.) Not our mandate

17. Is the oil sector in Nigeria pursuing environment degradation and pollution prevention?
    a) Yes b.) Sometimes c) No d.) Not our mandate

APPENDIX 15: RELIABILITY OF TOTAL TEST QUESTIONNAIRE INSTRUMENT

Sector	Response Value Xi	Response Value Odd Numbers. Xo	Response Value Even Numbers. Xe	Correlation
M	84	34	46	0.74
M	87	34	53	0.64
M	67	30	34	0.88
M	66	29	37	0.78
M	98	51	47	1.09
M	65	29	33	0.88
M	75	32	43	0.74
M	101	53	48	1.10
M	102	54	48	1.13
M	98	51	47	1.09
M	85	45	40	1.13
M	79	40	39	1.03
M	93	45	48	0.94
M	91	42	49	0.86
M	79	36	43	0.84
M	91	41	40	1.03
M	95	53	42	1.26
O&G	98	58	40	1.45
M	100	44	56	0.79
O&G	69	37	32	1.16
M	43	25	18	1.39
M	36	23	13	1.77
M	42	24	18	1.33
M	69	35	34	1.03
M	98	46	52	0.88
O&G	69	35	34	1.03
O&G	90	44	46	0.96
O&G	77	45	32	1.41
M	86	40	46	0.87
M	48	26	34	0.76
M	80	40	36	1.11
M	75	38	37	1.03

M	39	29	22	1.32
O&G	80	45	30	1.50
M	79	34	45	0.76
M	95	48	47	1.02
O&G	91	33	59	0.56
O&G	98	55	43	1.28
O&G	74	44	40	1.10
M	48	26	22	1.18
O&G	77	45	32	1.41
M	73	32	41	0.78
M	85	43	42	1.02
M	94	47	47	1.00
O&G	77	46	31	1.48
M	36	23	13	1.77
M	44	25	19	1.32
O&G	81	44	37	1.19
M	73	41	32	1.28
O&G	71	34	37	0.92
M	85	48	37	1.30
M	104	47	57	0.82
O&G	94	40	54	0.74
M	63	31	32	0.97
M	78	39	39	1.00
M	109	52	57	0.91
M	81	40	41	0.98
O&G	100	43	57	0.75
M	78	39	39	1.00
M	81	37	44	0.84
M	70	22	48	0.46
O&G	107	50	57	0.88
O&G	83	30	53	0.57
O&G	87	42	45	0.93
O&G	93	44	49	0.90
M	109	50	59	0.85
M	85	46	39	1.18
M	81	39	42	0.93
M	87	42	45	0.93
M	100	53	57	0.93
M	101	52	49	1.06
M	89	42	47	0.89
M	75	30	45	0.67
M	90	39	54	0.72
M	97	48	49	0.98
M	99	45	54	0.83
M	92	34	38	0.89
M	99	41	38	1.08
M	84	34	50	0.68
M	80	35	45	0.78
M	73	30	43	0.70
M	99	52	47	1.11

M	68	33	47	0.70
M	64	31	33	0.94
M	62	31	31	1.00
M	86	40	46	0.87
M	107	42	65	0.65
M	60	27	33	0.82
M	78	37	41	0.90
M	74	32	42	0.76
M	46	23	23	1.00
M	29	13	16	0.81
M	69	33	36	0.92
M	69	30	39	0.77
M	77	32	45	0.71
M	94	43	51	0.84
M	99	46	53	0.87
M	56	26	30	0.87
M	45	23	22	1.05
O&G	105	21	22	0.95
O&G	67	32	35	0.91
O&G	86	42	44	0.95
O&G	73	32	41	0.78
O&G	100	63	41	1.54
O&G	107	61	46	1.33
O&G	82	44	38	1.16
O&G	63	30	33	0.91
O&G	102	42	60	0.70
O&G	77	34	43	0.79
O&G	86	46	40	1.15
O&G	96	44	52	0.85
O&G	106	59	47	1.26
O&G	61	30	31	0.97
O&G	102	50	52	0.96
O&G	104	63	41	1.54
M	63	30	33	0.91
M	69	27	42	0.64
M	58	29	29	1.00
M	73	34	39	0.87
M	82	41	41	1.00
M	69	31	38	0.82
M	63	24	39	0.62
M	108	52	56	0.93
M	103	48	55	0.87
	9,992.00	**4,820**	**5,105**	**0.94**

Correlation **0.94**

Reliability of Total Test = **2(0.94)/1 +(0.94)**

= **1.88/1.94**

= **0.96**